Mercatoris Cosmographia

TRIGONOMETRIA SPHÆRICORUM Logarithmica,

Præceptis rotũdis ac planè Sphæricis, quibus nihil addere possis, neque demere;

cum

Canone Triangulorum emendatissimo,

continente

Logarithmos Sinuum & Tangentium ad singula Graduum Quadrantis Minuta Prima,

&

Ad Radium 100000. 00

Posterioris formæ, præstantiâ & commoditate, Illustri Nepero commendatâ, priorem longè superantis;

Publicis usibus adornata

à

NICOLAO Kauffman Holsato.

DANTISCI,

Typis commodante Andreâ Hünefeldt/

Anno cIↃ. IↃc. LI.

Prolegomena.

Præcepta hæc Trigonometrica plurimo docendi usu, nec minore limandi industriâ rotunditatem suam obtinuerunt, ut qui vulgares Additionis & Subtractionis species callet & Cosmographiam nostram uniâ chartâ comprehensam præmiserit, unâ & alterâ horâ perfectam hinc Triangulorum Sphæricorum dimensionem facilè comprehendere, facilius autem memoriâ tenere, at omnium facilimè exercere possit; ne sit opus quoties Triangulum aliquod solvendum venit, toties recurrere ad præcepta, ubi sæpe rodendus unguis, antequam datum casum invenias. His instructus decem haut amplius problematis, vix totidem horas postulantibus, omnem Astronomiæ doctrinam Sphæricam accipies, ita ut ex ipso fundamento noveris Tabularum omnium Primi Mobilis constructionem, & per calculum Trigonometricum facilius & citius expedire omnis generis quæstiones, quàm ex ipsis Tabulis Astronomicis; quæ, cùm ad gradus duntaxat singulos extendantur, semper adhærentibus Minutis competentem partem proportionalem investigandam relinquunt. Taceo nunc Geographica, Nautica, Gnomonica, nam -------

Cuncta Trigonus habet, quæ cœlum & terra coërcet. *Postulabant olim Rudolphinæ formam Logarithmorum antiquam, licèt illas commodioribus hisce Logarithmis conciliare satius fuisset; sed inventam ajunt rationem, quâ sine Tabulis facilius etiam secundorum Mobilium cursus expediantur, quæ ratio omnis generis Tabulis aptari queat (quid enim invium sit rationi?) Præterea cùm antiqui illi Logarithmi signis suis Cossicis nimium nobis facessant negotium;*

jure præferimus hosce posterioris formæ, quales de consilio Neperi & Briggij prioribus longè præstantiores & commodiores elaboravit Adrianus Vlaccus Goudanus, Vir optimè de hisce disciplinis meritus. Quoniam verò illud ingens est volumen, cui & alia multa sunt annexa, quæ cujusvis usibus non conveniunt, simulq; tædiosum est tam grandem librum quotidie portare & revolvere toties, Manuali hâc formâ Canonem Triangulorum concinnavi, cujus numeri curavi, ut essent quàm emendatissimi, quanquam alioquin ita sunt ordinati, ut ex collatione proximorum facilè incursurum in oculos, sicubi aberratum fuisset: & ob eandem causam ne differentias quidem adjungere operæ pretium erat, cùm earum usus sit rarior; sin usus, levi mentis operatione acquirantur. Quos Trigonometria Planorum Logarithmos postulat absolutorum numerorum, Astronomiæ Theoricæ reservamus absq; jacturâ, nam seorsim singula tradere consultum est, ut quilibet sibi quid & quantum lubet, eligere possit. Logarithmum Tangentis diximus Hapsolog-um; & Tangentis complementi Logarithmum, Anthapsolog-um: neq; enim phantasia rebus intenta latioribus vocabulis occupanda est, & si usquam, hîc licet ὀνοματοποιεῖν. Tu verò, mi Lector, vale, & nostris laboribus fave.

TRI-

TRIGONOMETRIA SPHÆRICORUM Logarithmica.

De Triangulis Rectangulis

Caput I.

Negledto angulo recto, cæterarum quinque partium tres semper in quæstionem cadunt, quarum duæ dantur, tertia quæritur. Atque harum trium una est *media*, duæ verò sunt *extremæ*.

Mediæ vel utraque vel neutra extremarum vicina est. V.g.

Fig. I^ma in triangulo R ♎ ☉ cadant in quæstionem ☉, ☉R, & R♎: ajo mediam esse ☉R, cui utraque extremarum ☉, & R ♎ vicina est (nam rectus angulus R negligitur.) Cadant autem in quæstionem ♎, ☉, & R♎: ajo mediam esse ☉, cui neutra extremarum ♎, & R♎ vicina est; sed ambæ sunt remotæ.

Objecto Rectangulo,
ea ſi

quæritur,

obſerva num extremas habeat

vicinas, *remotas,*

harum excerpes quarum excerpes

cruris Hapſo-log-um; *hypotenuſæ vel anguli* Anthapſo-log-um.

cruris Anti-log-um; *hypotenuſæ vel anguli* Log-um.

Subductâ lineâ *Adde*;

Summa detracto 1000000. 00rio

eſt Mediæ quæſitæ

cruris Log-us; *hypotenuſæ vel anguli* Antilog-us.

vide quæ ſit *media*;
fortè

datur,

pone mox ejuſdem mediæ

cruris Log-um; *hypotenuſæ vel anguli* Antilog-um:

cui aucto 1000000. 00^rio ſubſcribes datæ extremæ

vicinæ		*remotæ*	
cruris	*hypotenuſæ*	*cruris*	*hypotenuſæ*
Hapſo-	*vel anguli*	Anti-	*vel anguli*
log-um;	Anthapſolog-um.	log-um;	Log-um.

Subductâ lineâ *Subtrahe*;

Reſiduum eſt extremæ, quam quæris

vicinæ		*remotæ*	
cruris	*hypotenuſæ*	*cruris*	*hypotenuſæ*
Hapſo-	*vel anguli*	Anti-	*vel anguli*
log-us;	Anthapſolog-us.	log-us;	Log-us.

Exemplo sit Fig. Imâ Triangulum R ♎ ☉, *cujus tibi*

prædimus
- *angulos*
  1. *Rectum ad* R 90°.
  2. ♎ 23°. 30′.
  3. ☉ 69°. 15′.
- *latera*
  - *hypotenusam* ♎ ☉ 29°. 21′.
  - *crura*
    - R ☉ 11°. 16′.
    - R ♎ 27°. 17′.

Hoc Triangulum formabimus in omnes casus, qui unquam occurrere possunt, *vel* enim

Omnia præter rectum
- *Angulus angulus* *quærimus* *hypotenusa crus alterutrum.*
- *vel Angulus latus*
  - *angulus alteruter cum hypotenusa* *quærimus*
    - *alter angulus*
    - *crus angulo dato* — *oppositum* / *adjacens.*
  - *angulus alteruter cum crure* *quærimus*
    - *oppositum* — *alter angulus / hypotenusa / crus alterum.*
    - *adjacente* — *alter angulus / hypotenusa / crus alterum.*
- *vel Latus latus*
  - *hypotenusa cum crure alterutro* *quærimus*
    - *angulus dato cruri* — *oppositus* / *adjacens*
    - *crus alterum.*
  - *duo crura* *quærimus*
    - *angulus alteruter*
    - *hypotenusa.*

Exer-

Exercitatis ad hunc modum sufficere tandem potest unica hæc Regula:

Media Log-us æquat { *vicinarum Hapsolog-os* / *remotarum Antilog-os.*

Etenim cùm Media *quæritur*, quoniam hujus Log-us æquat extremarum numeros, oportebit hos addere, ut habeas numerum Mediæ.

Cùm verò Media *datur*, ab hujus Logarithmo (qui extremarum numeros æquat) auferes alterius extremæ numerum, ut relinquatur numerus quæsitæ.

Sed unum hoc notabis quàm diligentissimè: *Quoties* Hypotenusæ *vel* anguli *numerus quærendus est, tu semper accipito contrarium*; hoc est, pro Logarithmo Antilog-ũ, & vicisim pro Antilog-o Logarithmũ; sicut pro Hapsolog-o etiamnum Anthapsolog-um.

. Nota. *Quando Trianguli*, V. g. Fig. IIda R♈⊙, *pars aliqua excedit quadrantem*: quæ angulo recto Ropponitur hypotenusa ♈⊙ quadrante major est; reliquorum angulorum alteri obtuso ⊙ opponitur crus R♈ quadrante majus, alteri acuto ♈ crus R⊙ quadrante minus. *Productis* igitur *hypotenusa* ♈⊙, *& crure* ♈R *angulum acutum comprehendentibus*, donec iterum concurrendo forment alterum angulum ♎ gemellum isti priori ♈ angulo; *sume tibi solvendum hoc alterum* R♎⊙ *triangulum*, in quo ⊙♎ & R♎ sunt laterum prioris trianguli ♈⊙ & ♈R (datorum vel quærendorum) complementa ad semicirculum, quemadmodum etiam angulus R⊙♎ complementum est anguli R⊙♈ contigui: Sed anguli duo ♈ & ♎ sunt gemelli & æquales; latus verò R⊙ terminus est utriusque trianguli communis.

De Triangulis Obliquangulis

Caput II.

Propositio Prima.

TRianguli cujusque obliquanguli tres partes oportet

esse datas: hæ sunt *puræ*, cùm dantur mera latera, vel anguli meri; *miscellaneæ*, cùm latera & anguli mixtim dantur.

2. *Datis puris lateribus*; basis esto latus angulo quæsito oppositum. Inde semidifferentiam crurum ad semibasin addas, & ab eadē semibasi auferas: aggregati & residui logarithmos additos invicem auge 2000000. 00^{rio}; hinc aufer aggregatum ex logarithmis crurum; reliqui bipartiti logarithmi arcum duplica, & emerget angulus basi oppositus.

3. Ex *datis puris angulis* colliguntur latera, eodem modo, quo ex lateribus anguli; conversō tamen priùs unico quovis angulo in suum complementum ad semicirculum; atque huic oppositum latus, cùm inveneris, vicissim convertes in suum complementum ad semicirculum.

4. *Datis miscellaneis*; Datum angulum dato lateri contiguum (& si fortè duo dati anguli sint dato lateri contigui, eum ipsum, qui lateri quæsito opponitur; vel si neque latus quæritur, utrum sanè voles) notabis literâ α: dissimulatis interim notis, quibus alioquin trianguli partes insigniuntur.

5. Datum quoque latus dato angulo contiguum (& si fortè duo data latera sint dato angulo contigua, id ipsum quod angulo quæsito opponitur; vel si nec angulus quæritur, utrum sanè voles) notabis $\alpha\beta$. Tertius angulus notetur γ, vel Γ majusculo, quando constat obtusum esse. Estque β terminus, ex quo perpendicularis agenda venit in $\alpha\gamma$ latus oppositum, producendum, ubi perpendicularis cadit extra triangulum, quod contingit, quoties angulorum α & γ alter est obtusus; quo de mox pluribus.

Nota.

Nota. *Quando* $\alpha\beta$ *excedit quadrantem: productis* Fig. IIItiâ $\beta\alpha$ & $\beta\gamma$ *lateribus*, donec iterum concurrentia formentalterum angulum β gemellum isti priori β angulo; *sume tibi solvendum hoc alterum* $\alpha\beta\gamma$ *triangulum*, in quo dantur α & $\alpha\beta$ complementa ipsorum α & $\alpha\beta$ prioris trianguli, quemadmodum etiam γ & $\gamma\beta$ sunt ipsorum γ & $\gamma\beta$ prioris trianguli (datorum vel quærendorum) complementa ad semicirculum: sed anguli duo β & β sunt gemelli & æquales; latus verò $\alpha\gamma$ terminus est utriusque trianguli communis.

6. Interim *datis continuis*; formato seorsim triangulum $\alpha\beta\delta$ rectangulum ad δ, in quo dantur protinus ex principali triangulo angulus α & latus $\alpha\beta$: quæritur datis (in triangulo principali) duobus { lateribus, latus $\alpha\delta$ / angulis, angulus $\alpha\beta\delta$.

Ergo si, quorsum perpendicularis cadat, ambigis adhuc, attende: Quando latus hoc $\alpha\delta$ minus est latere $\alpha\gamma$, vel angulus hic $\alpha\beta\delta$ minor est angulo $\alpha\beta\gamma$; perpendicularis cadit intra triangulum: secus, extra.

Cùm α est { obtusus, summa / acut°, differentia } nimirum { laterum $\alpha\gamma$ & $\alpha\delta$ est latus $\gamma\delta$ / angulorum $\alpha\beta\gamma$ & $\alpha\beta\delta$ est angulus $\gamma\beta\delta$.

7. *Datis non-continuis*; si quorsum perpendicularis cadat ambigis, attende: Quando $\alpha\beta$ minus est, quàm $\beta\gamma$; angulus γ est acutus: quando verò $\alpha\beta$ majus est, quàm $\beta\gamma$; angulus γ anceps est, adeóq; tuo relinquitur arbitrio, utrum velis acutum an obtusum definire. Vide prop. quintam in fine.

8. Actam *perpendicularem* statim quære. Cætera solventi triangula illa duo rectangula sponte patebunt.

Exem-

Exemplo sit Fig. IV^ta Triangulum PFS, *cujus tibi*

proponuntur
- *latera*
  1. PF 23°. 30′.
  2. PS 62°. 49′.
  3. FS 64°. 18′.
- *angulos*
  1. P 87°. 38′.
  2. F 80°. 31′.
  3. S 26°. 14′.

Hoc Triangulum formabimus in omnes casus, qui unquam occurrere possunt, *vel* enim

datur
- *pura*
  - *latera, quaritur angulus quivis*
  - *anguli, quar. latus quodvis.*
- *vel mi-scel-la-nea*
  - *conti-nua*
    - *l.l.a* — PF,PS,P / PF,FS,F / PS,FS,S — *quaritur* — *ang. alteruter* / *latus 3tium.*
    - *l.a.a.* — PF,P,F / PS,P,S / FS,F,S — *quaritur* — *latus alterutrū* / *angulus 3tius.*
  - *non-conti-nua*
    - *l.a.a.* — PF,S, {P, F} / PS,F, {P, S} / FS,P, {F, S} — *quaritur* — *lat.* {βγ, αγ} / *ang. tertius.*
    - *l.l.a.* — PF,PS, {F, S} / PF,FS, {P, S} / PS,FS, {P, F} — *quaritur* — *ang.* {γ, β} / *lat. tertium.*

V. g.

V. g. Dentur trianguli P F S *pura latera*, quæratur angulus P. Ergo per 2 hujus capitis

Basis est F S	64°. 18′.	*oppos. sc. angulo* P *quæsito.*	
semibasis	32. 9.		
crura P F	23. 30.	*Log-us*	960070
crura P S	62. 49.	*Log-us*	994917
differentia	39. 19.	*aggreg.*	1954987
semidifferentia	19. 39½.		
semibasis	32. 9.		
aggregatum	51. 48½.	*Log-us*	989539
residuum	12. 29½.	*Log-us*	933505
		additos	1923044
		auge	2000000rio
			3923044
aggreg. ex log-is crurum			1954987
		reliqui	1968057
		bipartiti	984028

log-i arcus 43°. 48′. 40″.
duplicatus 87. 37. 20. *est angulus* p.
basi oppositus.

Dentur autem ejusdem trianguli *puri anguli*, quæratur latus P F. Ergo per 3 hujus capitis, convertendus est prius unicus quivis angulus V. g.

S 26°. 14'. in suum
ad semicirculum 180.

complementum 153. 46. quod per 2 erit quasi-basis, oppos. sc. lateri P F quasito.
semibasis 76. 53.

quasi-crura { P 87. 38. Log-us 999963
F 80. 31. Log-us 999402

differentia 7. 7. aggreg. 1999365
semidifferentia 3. 33½.
semibasis 76. 53.

aggregatum 80. 26½. Log-us 999393
residuum 73. 15½. Logus 998134

additos 1997527
auge 2000000 rio

3997527
aggreg. ex log-is crurum 1999365

reliqui 1998162
bipartiti 999081

log-i arcus 78. 15'.
duplicatus 156. 30. convertendus per 3 in suum
ad semicirculū 180.

complementū 23. 30. quod est latus P F.

Cæteris casibus acta perpendicularis ex angulo, cui suffragia datorum arrogant literam S (quod variantibus datis cuivis trium angulorum P, F, S obtingere potest) cùm transformet ipsum principale triangulum in duo rectangu-

rectangula, quorum solutione cætera debent innotescere : ecce tibi perpendicularem actam Fig. V^ta ex P, VI^ta ex F, VII^ma ex S hîc prodimus unà cum angulis quos efficit ad β, quæque his opponuntur cruribus; quo tanquam Ariadnæi ductu fili labyrinthum hunc Trigonometricum feliciter emetiaris.

Fig. V^ta
- *perpendicularis* P ♂ 23°. 10′.
- *angulus* FP ♂ (ΓP ♂) 10°. 19′.
- *angulus* SP ♂ 77°. 18′.
- *crus* F ♂ (Γ ♂) 4°. 6′.
- *crus* S ♂ 60°. 12′.

Fig. VI^ta
- *perpendicularis* F ♂ 23°. 28′.
- *angulus* PF ♂ (ΓF ♂) 2°. 35′.
- *angulus* SF ♂ 77°. 56′.
- *crus* P ♂ (Γ ♂) 1°. 2′.
- *crus* S ♂ 61°. 47′.

Fig. VII^ma
- *perpendicularis* S ♂ 62°. 43′.
- *angulus* PS ♂ (ΓS ♂) 5°. 10° 1/3.
- *angulus* FS ♂ 21°. 2 1/2.
- *crus* P ♂ (Γ ♂) 4°. 36′.
- *crus* F ♂ 18°. 54′.

r obtusus est anguli γ acuti complementum ad 180°.

Non secus in omnes casus formabitur Fig. VIII^vo Obtusangulum PFS, *cujus tibi*

prodimus

proximus
- latera
  - 1 PF 15°. 46′.
  - 2 PS 80°. 31′.
  - 3 FS 87°. 38′.
- angulos
  - 1 P 64°. 18′.
  - 2 F 62°. 49′.
  - 3 S 156°. 30′.

Pródimus item ejusdem Obtusanguli in duo rectangula transformati

Fig. IX^na (vide notam subjectam prop. 5tæ hujus Capitis.)
- Perpendicularem P ∂ 25°. 10′.
- angulum
  - FP ∂ (Γ P ∂) 29°. 48′.
  - SP ∂ 85°. 54′.
- crus
  - F ∂ (Γ ∂) 12°. 42′.
  - S ∂ 79°. 41′.

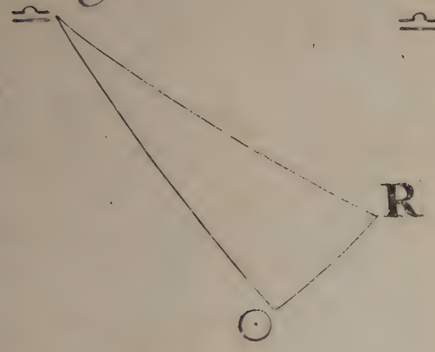
Fig. X^ma (vide notam subjectam prop. 5tæ hujus Capitis.)
- perpendicularem F ∂ 23°. 28′.
- angulum
  - PF ∂ (Γ F ∂) 28°. 13′.
  - SF ∂ 88°. 58′.
- crus
  - P ∂ (Γ ∂) 12°. 4.
  - S ∂ 87°. 25′.

Fig. XI^ma
- perpendicularem S ∂ 62°. 43′.
- angulum
  - PS ∂ (Γ S ∂) 71°. 6.
  - FS ∂ 85°. 24′.
- crus
  - P ∂ (Γ ∂) 68°. 56′.
  - F ∂ 84°. 50′.

Hîc inserantur Figuræ.

Ad pag. 12. Trigonometriæ.

Fig I.



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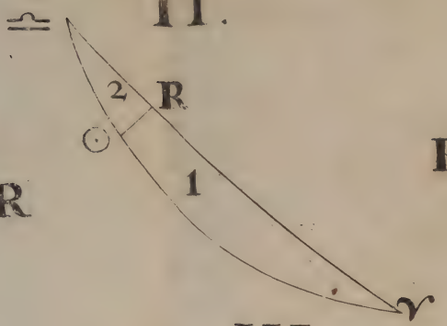

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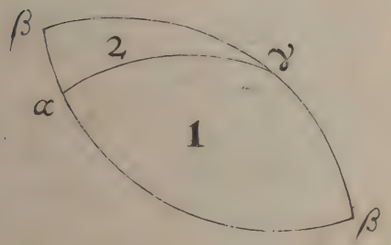

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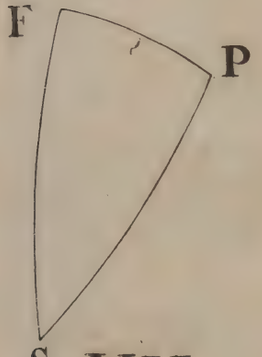

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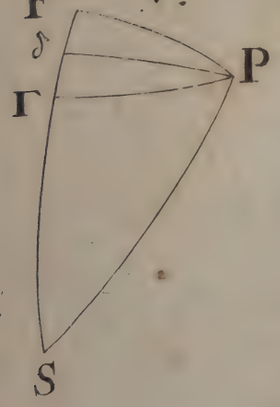

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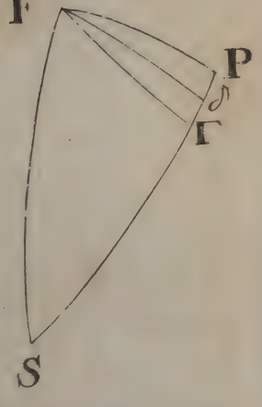

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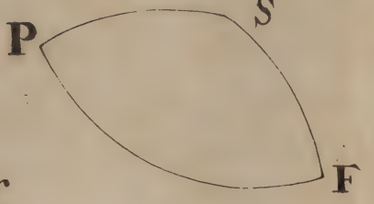

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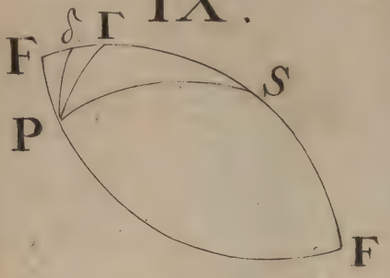

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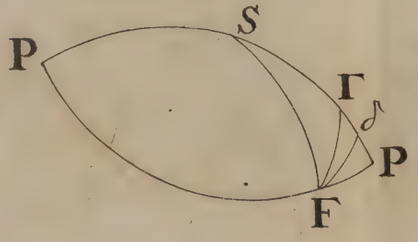

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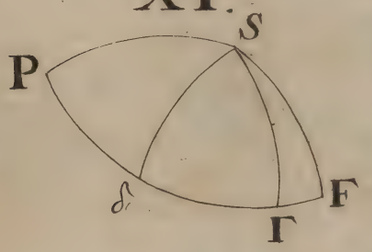
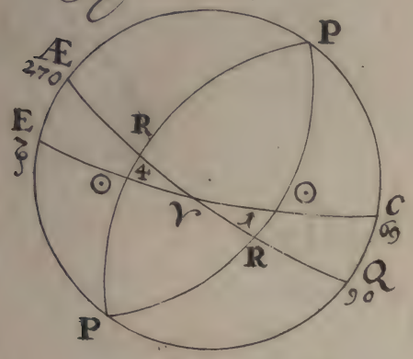


Johann Bass sculps.

Astronomia Sphærica

Subjungenda Lamina A

Fig I.



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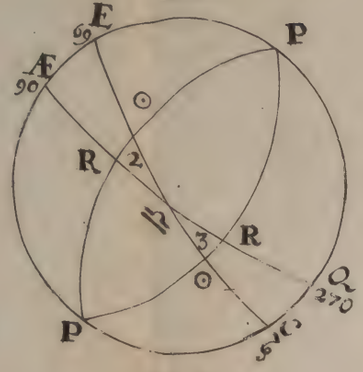

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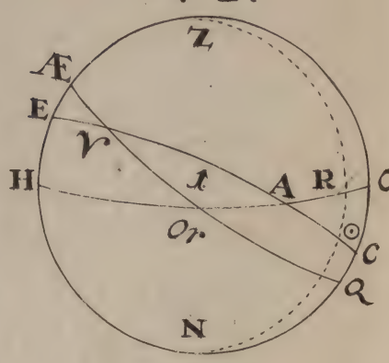

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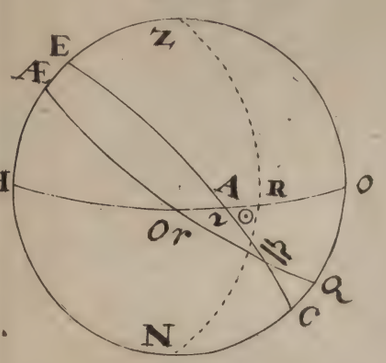

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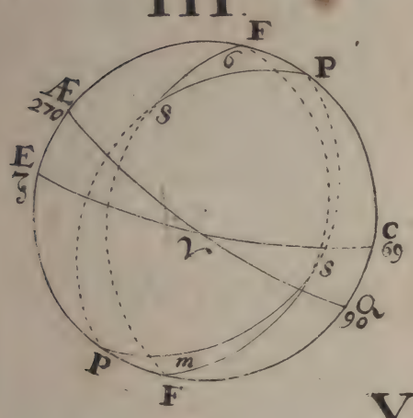
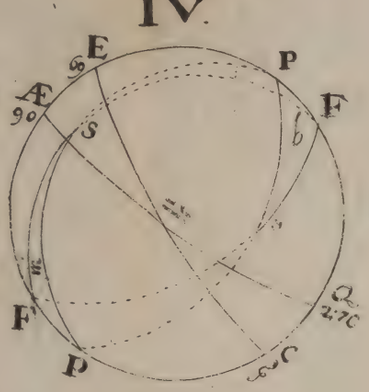
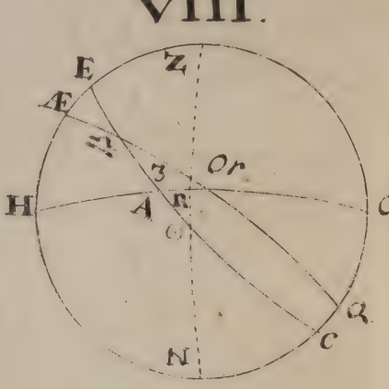


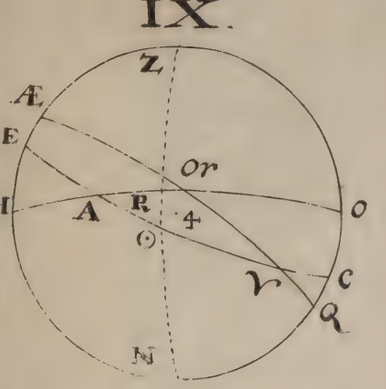
IV.



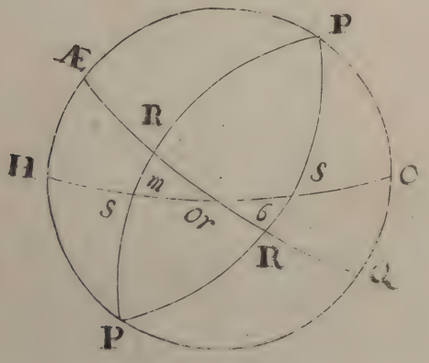
VIII.



IX.

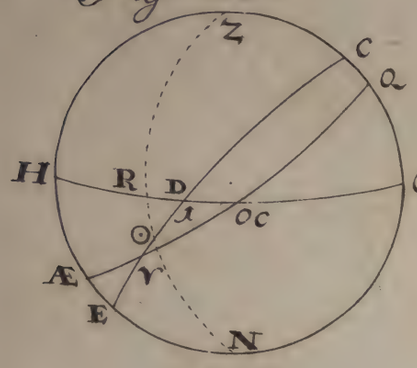


V.

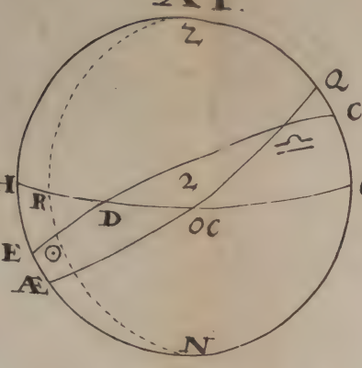


Lamina B

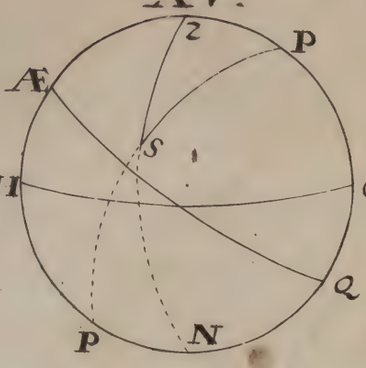
Fig. X.



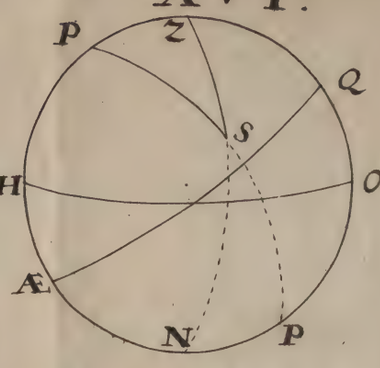
XI.



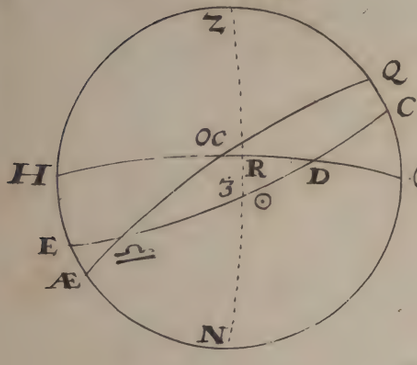
XV.



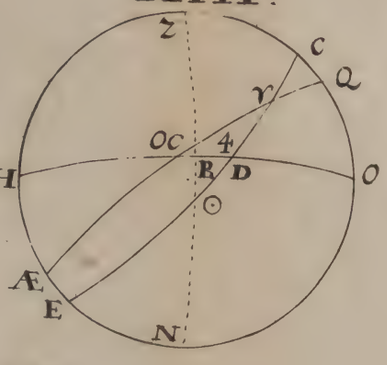
XVI.



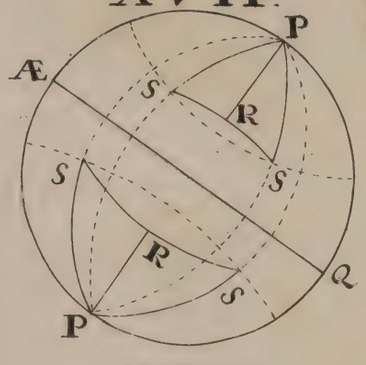
XII.



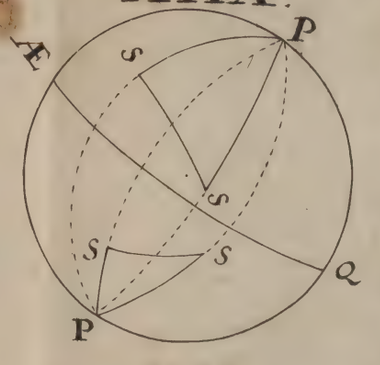
XIII.



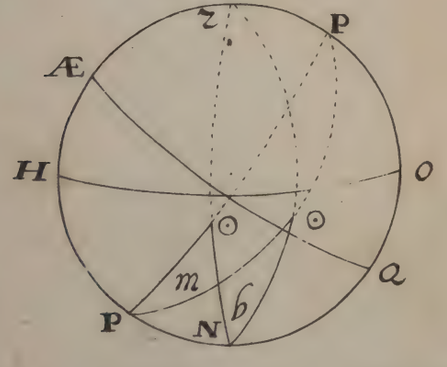
XVII.



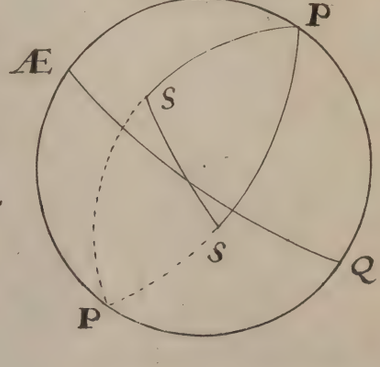
XIIX.



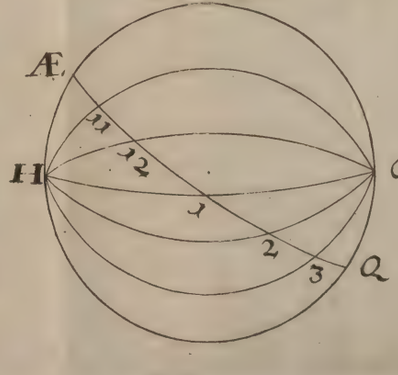
XIV.



XIX.



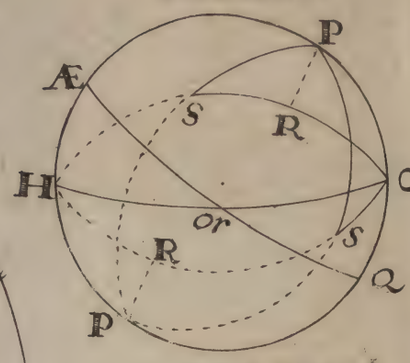
XX.



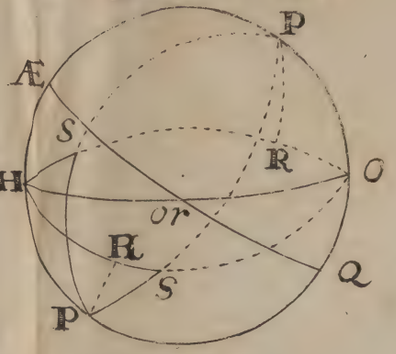
Lamina C

XXI.

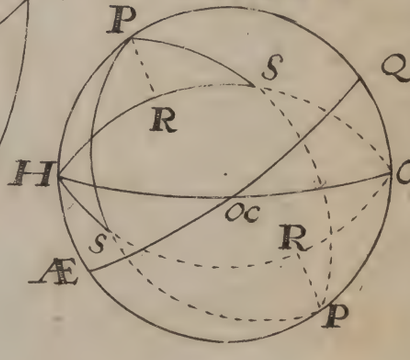
XXII.



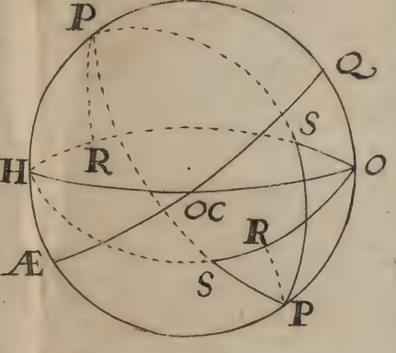
XXIII.



XXIV



XXV



Latitudo

♄ ni	21′.	M. A.	♀ ris	5°.	5′.	B. D.
♃ vis	5ó.	B. A.	☿ rij	1°.	9′.	B. D.
♂ tis	3°.	ó.	B D.	☽ næ	5°.	2′.	M. A.

Johann Bass sculps:

CANON TRIANGULORUM,

continens

Logarithmos Sinuum & Tangentium ad singula Graduum Quadrantis Minuta Prima,

&

Ad Radium 100000,00.

0	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	0	0	Infinitum	1000000.00	60
1	646372.61	646372.61	1353627.39	1000000.00	59
2	676475.61	676475.62	1323524.38	999999.99	58
3	694084.73	694084.75	1305915.25	98	57
4	706578.60	706578.63	1293421.37	97	56
5	16269.60	16269.64	83730.36	95	55
6	24187.71	24187.78	75812.22	93	54
7	30882.39	30882.48	69117.52	91	53
8	36681.57	36681.69	63318.31	88	52
9	41796.81	41796.96	58203.04	87	51
10	746372.55	746372.73	1253627.27	999999.82	50
11	50511.81	50512.03	49487.97	78	49
12	54290.65	54290.91	45709.09	74	48
13	57766.84	57767.15	42232.85	69	47
14	60985.30	60985.66	39014.34	64	46
15	63981.60	63982.01	36017.99	59	45
16	66784.45	66784.92	33215.08	53	44
17	69417.33	69417.86	30582.14	47	43
18	71899.66	71900.26	28099.74	40	42
19	74247.75	74248.41	25751.59	34	41
20	776475.37	776476.10	1223523.90	999999.27	40
21	78594.27	78595.08	11404.92	19	39
22	80614.58	80615.47	19384.53	11	38
23	82545.07	82546.04	17453.96	999999.03	37
24	84393.38	84394.44	15605.56	999998.94	36
25	86166.23	86167.38	13832.62	85	35
26	87869.53	8 870.77	12129.23	76	34
27	89508.54	89509.88	10490.12	66	33
28	91087.93	91089.38	08910.62	56	32
29	92611.90	92613.44	07386.56	45	31
30	794084.19	794085.84	1205914.16	999998.35	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	89

	Log-us.	Haplolog-us.	Anthaplolog-us.	Antilog-us	
30	794084.19	794085.84	1205914.16	999998.35	30
31	95508.19	95509.96	04490.04	23	29
32	96886.98	96888.86	03111.14	12	28
33	98223.34	98225.34	01774.66	999998.00	27
34	799519.80	799521.92	1200478.08	999997.88	26
35	800778.67	800780.92	1199219.08	7.75	25
36	02002.07	02004.45	97995.55	7.62	24
37	03191.95	03194.46	96805.54	7.48	23
38	04350.09	04352.74	95647.26	7.35	22
39	05478.14	05480.94	94519.06	7.21	21
40	806577.63	806580.57	1193419.43	999997.06	20
41	07649.97	07653.06	92346.94	6.91	19
42	08696.46	08699.70	91300.30	6.76	18
43	809718.32	809721.72	1190278.28	6.60	17
44	810716.69	810720.25	1189279.75	6.44	16
45	1692.62	1696.34	8303.66	6.28	15
46	2647.10	2650.99	7349.01	6.11	14
47	3581.04	3585.10	6414.90	5.94	13
48	4495.32	4499.56	5500.44	5.77	12
49	5390.75	5395.16	4604.84	5.59	11
50	816268.08	816272.67	1183727.33	999995.41	10
51	7128.04	7132.82	2867.18	5.22	9
52	7971.29	7976.26	2013.74	5.03	8
53	8798.48	8803.64	1196.36	4.84	7
54	819610.20	819615.56	1180384.44	4.64	6
55	820407.03	820412.59	1179587.41	4.44	5
56	1189.49	1195.26	8804.74	4.24	4
57	1958.11	1964.08	8035.92	4.03	3
58	2713.35	2719.53	7280.47	3.82	2
59	3455.68	3462.08	6537.92	3.60	1
60	824185.53	824192.15	1175807.85	999993.38	0
	Antilog-us	Anthaplol.	Haplolog-us	Log-us.	89

I	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	824185.53	824192.15	1175807.85	999993.38	60
1	4903.32	4910.15	5089.85	3.16	59
2	5609.43	5616.49	4383.51	2.94	58
3	6304.24	6311.53	3688.47	2.71	57
4	6988.10	6995.63	3004.37	2.47	56
5	7661.36	7669.12	2330.88	2.24	55
6	8324.34	8332.34	1667.66	2.00	54
7	8977.34	8985.59	1014.41	1.75	53
8	829620.67	829629.17	1170370.83	1.50	52
9	830254.60	830263.35	1169736.65	1.25	51
10	830879.41	830888.42	1169111.58	999991.00	50
11	1495.36	1504.62	8495.38	0.74	49
12	2102.69	2112.21	7887.79	0.47	48
13	2701.63	2711.43	7288.57	999990.21	47
14	3292.43	3302.49	6697.51	999989.94	46
15	3875.29	3885.63	6114.37	9.66	45
16	4450.43	4461.05	5538.95	9.39	44
17	5018.05	5028.95	4971.05	9.11	43
18	5578.35	5589.53	4410.47	8.82	42
19	6131.50	6142.97	3857.03	8.53	41
20	836677.69	836689.45	1163310.55	999988.24	40
21	7217.10	7229.15	2770.85	7.94	39
22	7749.88	7762.23	2237.77	7.64	38
23	8276.20	8288.86	1711.14	7.34	37
24	8796.22	8809.18	1190.82	7.03	36
25	9310.08	9323.36	0676.64	6.72	35
26	839817.93	839831.52	1160168.48	6.41	34
27	840319.90	840333.81	1159666.19	6.09	33
28	0816.14	0830.37	9169.63	5.77	32
29	1306.76	1321.32	8678.68	5.44	31
30	841791.90	841806.79	1158193.21	999985.12	30
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	88

I	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
30	841791.90	841806.79	1158193.21	999985.11	30
31	2271.68	2286.90	7713.10	4.78	29
32	2746.21	2761.76	7238.24	4.45	28
33	3215.61	3231.50	6768.50	4.11	27
34	3679.99	3696.22	6303.78	3.76	26
35	4139.44	4156.03	5843.97	3.42	25
36	4594.09	4611.03	5388.97	3.06	24
37	5044.02	5061.31	4938.69	2.71	23
38	5489.34	5506.99	4493.01	2.35	22
39	5930.13	5948.14	4051.86	1.99	21
40	846366.49	846384.86	1153615.14	999981.62	20
41	6798.50	6817.25	3182.75	1.25	19
42	7226.26	7245.38	2754.62	0.88	18
43	7649.84	7669.33	2330.67	0.50	17
44	8069.32	8089.20	1910.80	999980.12	16
45	8484.79	8505.05	1494.95	999979.74	15
46	8896.32	8916.96	1083.04	9.35	14
47	9303.98	9325.02	0674.98	8.96	13
48	849707.84	849729.28	1150270.72	8.56	12
49	850107.98	850129.82	1149870.18	8.17	11
50	850504.47	850526.71	1149473.29	999977.76	10
51	0897.36	0920.01	9079.99	7.36	9
52	1286.73	1309.78	8690.22	6.95	8
53	1672.64	1696.10	8303.90	6.53	7
54	2055.14	2079.02	7920.98	6.12	6
55	2434.30	2458.60	7541.40	5.70	5
56	2810.17	2834.90	7165.10	5.27	4
57	3182.81	3207.97	6792.03	4.84	3
58	3552.28	3577.87	6422.13	4.41	2
59	3918.63	3944.66	6055.34	3.98	1
60	854281.92	854308.38	1145691.62	999973.54	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	88

2	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	85428[illegible].92	854308.38	1145091.62	999973.54	60
1	4642.18	4669.09	5330.91	3.09	59
2	4999.48	5026.83	4973.17	3.65	58
3	5353.86	5381.66	4618.34	2.20	57
4	5705.36	5733.62	4266.38	1.74	56
5	6054.04	6082.76	3917.24	1.28	55
6	6399.94	6429.12	3570.88	0.82	54
7	6743.10	6772.75	3227.25	999970.36	53
8	7083.57	7113.68	2886.32	999969.89	52
9	7421.39	7451.97	2548.03	9.42	51
10	857756.60	857787.66	1142212.34	999968.94	50
11	8089.23	8120.77	1879.23	8.46	49
12	8419.33	8451.36	1548.64	7.98	48
13	8746.94	8779.45	1220.55	7.49	47
14	9072.09	9105.09	0894.91	7.00	46
15	9394.83	9428.32	0571.68	6.50	45
16	859715.17	859749.17	1140250.83	6.01	44
17	860033.17	860067.67	1139932.33	5.50	43
18	0348.86	0383.86	9616.14	5.00	42
19	0662.26	0697.77	9302.23	4.49	41
20	860973.41	861009.43	1138990.57	999963.98	40
21	1282.35	1318.89	8681.11	3.46	39
22	1589.10	1626.16	8373.84	2.94	38
23	1893.69	1931.27	8068.73	2.42	37
24	2196.16	2234.27	7765.73	1.89	36
25	2496.53	2535.18	7464.82	1.36	35
26	2794.84	2834.02	7165.98	0.82	34
27	3091.11	3130.83	6869.17	999960.28	33
28	3385.37	3425.63	6574.37	999959.74	32
29	3677.64	3718.45	6281.55	9.19	31
30	863907.96	864009.31	1135990.69	999958.65	30
	Antilog us	Anthapfol.	Hapfolog-us	Log-us.	87

2	Log us	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	863967.96	864009.31	1135990.69	999958.65	30
31	4256.34	4298.25	5701.75	8.09	29
32	4542.82	4585.28	5414.72	7.53	28
33	4827.42	4870.44	5129.56	6.97	27
34	5110.16	5153.75	4846.25	6.41	26
35	5391.07	5435.22	4564.78	5.84	25
36	5670.17	5714.90	4285.10	5.27	24
37	5947.48	5992.79	4007.21	4.69	23
38	6223.03	6268.91	3731.09	4.11	22
39	6496.84	6543.31	3456.69	3.53	21
40	866768.93	866815.98	1133184.02	999952.95	20
41	7039.32	7086.97	2913.03	2.36	19
42	7308.04	7356.28	2643.72	1.76	18
43	7575.10	7623.93	2376.07	1.16	17
44	7840.51	7889.96	2110.04	999950.56	16
45	8104.33	8154.37	1845.63	999949.96	15
46	8366.54	8417.19	1582.81	9.35	14
47	8627.18	867844.	1321.56	8.74	13
48	8886.25	8938.13	1061.87	8.12	12
49	9143.79	9196.29	0803.71	7.50	11
50	869399.80	869452.92	1130547.08	999946.88	10
51	9654.31	9708.06	0291.94	6.25	9
52	869907.34	869961.72	1130038.28	5.62	8
53	870158.89	870213.90	1129786.10	4.98	7
54	0408.99	0464.65	9535.35	4.35	6
55	0657.66	0713.95	9286.05	3.70	5
56	0904.90	0961.85	9038.15	3.06	4
57	1150.75	1208.34	8791.66	2.41	3
58	1395.20	1453.45	8546.55	1.76	2
59	1638.29	1697.19	8302.81	1.10	1
60	871880.02	871939.58	1128060.42	999940.44	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	87

3	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	871880.02	871939.58	1128060.42	999940.44	60
1	2120.40	2180.63	7819.37	999939.78	59
2	2359.46	2420.35	7579.65	9.11	58
3	2597.21	2658.77	7341.23	8.44	57
4	2833.66	2895.89	7104.11	7.76	56
5	3068.82	3131.74	6868.26	7.08	55
6	3302.72	3366.31	6633.69	6.40	54
7	3535.35	3599.64	6400.36	5.72	53
8	3766.75	3831.72	6168.28	5.03	52
9	3996.91	4062.58	5937.42	4.33	51
10	874225.86	874292.22	1125707.78	999933.6	50
11	4453.60	4520.67	5479.33	2.93	49
12	4680.15	4747.92	5252.08	2.23	48
13	4905.53	4974.00	5026.00	1.52	47
14	5129.73	5198.92	4801.08	0.81	46
15	5352.78	5422.69	4577.31	999930.09	45
16	5574.69	5645.31	4354.69	999929.38	44
17	5795.46	5866.81	4133.19	8.65	43
18	6015.12	6087.19	3912.81	7.93	42
19	6233.66	6306.47	3693.53	7.20	41
20	876451.11	876524.65	1123475.35	999926.46	40
21	6667.47	6741.75	3258.25	5.72	39
22	6882.75	6957.77	3042.23	4.98	38
23	7096.97	7172.74	2827.26	4.24	37
24	7310.14	7386.65	2613.35	3.49	36
25	7522.26	7599.52	2400.48	2.74	35
26	7733.34	7811.36	2188.64	1.98	34
27	7943.40	8022.18	1977.82	1.22	33
28	8152.44	8231.99	1768.01	999920.46	32
29	8360.48	8440.79	1559.21	999919.69	31
30	878567.53	878648.61	1121351.39	999918.92	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us	86

3	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	878567.53	878648.61	1121351.39	999918.92	30
31	8773.59	8855.44	1144.56	8.15	29
32	8978.67	9061.30	0938.70	7.37	28
33	9182.78	9266.20	0733.80	6.59	27
34	9385.94	9470.14	0529.86	5.80	26
35	9588.14	9673.13	0326.87	5.01	25
36	9789.41	879875.19	1120124.81	4.22	24
37	879989.74	880076.32	1119923.68	3.42	23
38	880189.15	0276.53	9723.47	2.62	22
39	0387.64	0475.83	9524.17	1.82	21
40	880585.23	880674.22	1119325.78	999911.01	20
41	0781.92	0871.72	9128.28	999910.20	19
42	0977.72	1068.34	8931.66	999909.38	18
43	1172.64	1264.07	8735.93	8.56	17
44	1366.68	1458.94	8541.06	7.74	16
45	1559.85	1652.94	8347.06	6.91	15
46	1752.17	1846.08	8153.92	6.08	14
47	1943.63	2038.38	7961.62	5.25	13
48	2134.25	2229.84	7770.16	4.41	12
49	2324.04	2420.46	7579.54	3.57	11
50	882512.99	882610.26	1117389.74	999902.73	10
51	2701.12	2799.24	7200.76	1.88	9
52	2888.44	2987.41	7012.59	1.03	8
53	3074.95	3174.78	6825.22	999900.17	7
54	3260.66	3361.34	6638.66	999899.31	6
55	3445.57	3547.12	6452.88	8.45	5
56	3629.69	3732.11	6267.89	7.58	4
57	3813.04	3916.33	6083.67	6.71	3
58	3995.61	4099.77	5900.23	5.84	2
59	4177.41	4282.45	5717.55	4.96	1
60	884358.45	884464.37	1115535.63	999894.08	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	86

4	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	884358.45	884464.37	1115535.63	999894.08	60
1	4538.74	4645.54	5354.46	3.19	59
2	4718.27	4825.97	5174.03	2.30	58
3	4897.07	5005.66	4994.34	1.41	57
4	5075.12	5184.61	4815.39	999890.52	56
5	5252.45	5362.83	4637.17	999889.62	55
6	5429.05	5540.34	4459.66	8.71	54
7	5604.93	5717.13	4282.87	7.80	53
8	5780.10	5893.21	4106.79	6.89	52
9	5954.57	6068.59	3931.41	5.98	51
10	886128.33	886243.27	1113756.73	999885.06	50
11	6301.39	6417.25	3582.75	4.14	49
12	6473.76	6590.55	3409.45	3.21	48
13	6645.45	6763.17	3236.83	22.8	47
14	6816.46	6935.11	3064.89	1.35	46
15	6986.80	7106 38	2893.62	999880.41	45
16	7156.46	7276.99	2723.01	999879.47	44
17	7325.46	7446.94	2553.06	8.53	43
18	7493.81	7616.23	2383.77	7.58	42
19	7661.50	7784.87	2215.13	6.63	41
20	887828.54	887952.86	1112047.14	999875.67	40
21	7994.93	8120.22	1879.78	4.71	39
22	8160.69	8286.94	1713.06	3.75	38
23	8325.81	8453.03	1546.97	2.78	37
24	8490.31	8618.50	1381.50	1.81	36
25	8654.18	8783.34	1216.66	999870.84	35
26	8817.43	8947.57	1052.43	999869.86	34
27	8980.07	9111.19	0888.81	8.88	33
28	9142.09	9274.20	0725.80	7.90	32
29	9303.51	9436.60	0563.40	6.91	31
30	889464.33	889598.42	1110401.58	999865.91	30
	Antilog-us	Anthapfol	Hapfolog-us	Log-us.	85

4	Log us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	889464.33	889598.42	1110401.58	999865.91	30
31	9624.55	9759.63	0240.37	4.9	29
32	9784.18	889920.26	1110079.74	3.91	28
33	889943.22	890080.30	1109919.70	2.92	27
34	890101.68	0239.77	9760.23	1.91	26
35	0259.55	0398.66	9601.34	999860.90	25
36	0416.85	0556.97	9443.03	999859.88	24
37	0573.55	0714.72	9285.28	8.86	23
38	0729.75	0871.90	9128.10	7.84	22
39	0885.35	1028.53	8971.47	6.82	21
40	891040.39	891184.60	1108815.40	999855.79	20
41	1194.87	1340.12	8659.88	4.75	19
42	1348.81	1495.09	8504.91	3.72	18
43	1502.19	1649.52	8350.48	2.68	17
44	1655.04	1803.40	8196.60	1.63	16
45	1807.34	1956.75	8043.25	999850.58	15
46	1959.11	2109.57	7890.43	999849.53	14
47	2110.34	2261.86	7738.14	48.48	13
48	2261.05	2413.63	7586.37	47.42	12
49	2411.23	2564.87	7435.13	46.36	11
50	892560.89	892715.60	1107284.40	999845.29	10
51	2710.03	2865.81	7134.19	44.22	9
52	2858.66	3015.52	6984.48	43.15	8
53	3006.78	3164.71	6835.29	42.07	7
54	3154.39	3313.40	6686.60	40.99	6
55	3301.50	3461.60	6538.40	39.90	5
56	3448.11	3609.29	6390.71	38.81	4
57	3594.22	3756.50	6243.50	37.72	3
58	3739.83	3903.21	6096.79	36.63	2
59	3884.96	4049.44	5950.56	35.53	1
60	894029.62	894195.18	1105804.82	999834.42	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	85

5	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	894029.60	894195.18	1105804.82	999834.42	60
1	4173.76	4340.44	5659.56	33.32	59
2	4317.43	4485.23	5514.77	32.20	58
3	4460.63	4629.54	5370.46	31.09	57
4	4603.35	4773.38	5226.62	29.97	56
5	4745.61	4916.76	5083.24	28.85	55
6	4887.39	5059.67	4940.33	27.72	54
7	5028.71	5202.11	4797.89	26.60	53
8	5169.57	5344.10	4655.90	25.46	52
9	5309.96	5485.64	4514.36	24.33	51
10	895449.91	895626.72	1104373.28	999823.18	50
11	5589.40	5767.35	4232.65	22.04	49
12	5728.43	5907.54	4092.46	20.89	48
13	5867.03	6047.28	3952.72	19.74	47
14	6005.17	6186.59	3813.41	18.59	46
15	6142.88	6325.45	3674.55	17.43	45
16	6280.14	6463.88	3536.12	16.26	44
17	6416.97	6601.88	3398.12	15.10	43
18	6553.37	6739.44	3260.56	13.93	42
19	6689.34	6876.58	3123.42	12.75	41
20	896824.87	897013.30	1102986.70	999811.58	40
21	6959.99	7149.59	2850.41	10.40	39
22	7094.68	7285.47	2714.53	09.21	38
23	7228.95	7420.92	2579.08	08.02	37
24	7362.80	7555.97	2444.03	06.83	36
25	7496.24	7690.60	2309.40	05.63	35
26	7629.26	7824.83	2175.17	04.43	34
27	7761.88	7958.65	2041.35	03.23	33
28	7894.08	8092.06	1907.94	02.02	32
29	8025.89	8225.07	1774.93	999800.81	31
30	898157.29	898357.69	1101642.31	999799.60	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	84

5	Log us.	Hapfolog-us.	Anthaplog-us.	Antilog-us	
30	898157.29	898357.69	1101642.31	999799.60	30
31	8288.29	8489.91	1510.09	98.38	29
32	8418.89	8621.73	1378.27	97.16	28
33	8549.10	8753.17	1246.83	95.93	27
34	8678.91	8884.21	1115.79	94.70	26
35	8808.34	9014.87	0985.13	93.47	25
36	8937.37	9145.14	0854.86	92.23	24
37	9066.02	9275.03	0724.97	90.99	23
38	9194.29	9404.54	0595.46	89.75	22
39	9322.17	9533.67	0466.33	88.50	21
40	899449.68	899662.43	1100337.57	999787.25	20
41	9576.81	9790.81	0209.19	85.99	19
42	9703.56	899918.83	1100081.17	84.73	18
43	9829.94	900046.47	1099953.53	83.47	17
44	899955.95	0173.75	9826.25	82.20	16
45	900081.60	0300.66	9699.34	80.93	15
46	0206.87	0427.21	9572.79	79.66	14
47	0331.79	0553.40	9446.60	78.38	13
48	0456.34	0679.24	9320.76	77.10	12
49	0580.53	0804.71	9195.29	75.82	11
50	900704.36	900929.84	1099070.16	999774.53	10
51	0827.84	1054.61	8945.39	73.23	9
52	0950.96	1179.03	8820.97	71.94	8
53	1073.74	1303.10	8696.90	70.64	7
54	1196.16	1426.82	8573.18	69.33	6
55	1318.23	1550.21	8449.79	68.03	5
56	1439.96	1673.25	8326.75	66.72	4
57	1561.35	1795.94	8204.06	65.40	3
58	1682.39	1918.31	8081.69	64.08	2
59	1803.09	2040.33	7959.67	62.76	1
60	901923.46	902162.02	1097837.98	999761.43	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	84

6	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	901923.46	902162.02	1097837.98	999761.43	60
1	2043.48	2283.38	7716.62	60.11	59
2	2163.18	2404.41	7595.59	58.77	58
3	2282.54	2525.10	7474.90	57.43	57
4	2401.57	2645.48	7354.52	56.09	56
5	2520.27	2765.52	7234.48	54.75	55
6	2638.65	2885.24	7114.76	53.40	54
7	2756.69	3004.64	6995.36	52.05	53
8	2874.42	3123.73	6876.27	50.69	52
9	2991.82	3242.49	6757.51	49.33	51
10	903108.90	903360.93	1096639.07	999747.97	50
11	3225.67	3479.06	6520.94	46.60	49
12	3342.12	3596.88	6403.12	45.23	48
13	3458.25	3714.39	6285.61	43.86	47
14	3574.07	3831.59	6168.41	42.48	46
15	3689.58	3948.48	6051.52	41.10	45
16	3804.77	4065.06	5934.94	39.71	44
17	3919.66	4181.34	5818.66	38.33	43
18	4034.24	4297.31	5702.69	36.93	42
19	4148.52	4412.99	5587.01	35.54	41
20	904262.49	904528.36	1095471.64	999734.14	40
21	4376.17	4643.43	5356.57	32.73	39
22	4489.54	4758.21	5241.79	31.32	38
23	4601.61	4872.70	5127.30	29.91	37
24	4715.38	4986.89	5013.11	28.50	36
25	4827.86	5100.78	4899.22	27.08	35
26	4940.05	5214.39	4785.61	25.66	34
27	5051.94	5327.71	4672.29	24.23	33
28	5163.54	5440.74	4559.26	22.80	32
29	5274.85	5553.49	4446.51	21.37	31
30	905385.88	905665.95	1094334.05	999719.93	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	83

6	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us.	
30	905385.88	905665.95	1094334.05	999719.93	30
31	5496.61	5778.13	4221.87	18.49	29
32	5607.06	5890.02	4109.98	17.04	28
33	5717.23	6001.64	3998.36	15.59	27
34	5827.11	6112.97	3887.03	14.14	26
35	5936.72	6224.03	3775.97	12.68	25
36	6046.04	6334.81	3665.18	11.22	24
37	6155.09	6445.33	3554.67	09.76	23
38	6263.86	6555.56	3444.44	08.29	22
39	6372.35	6665.53	3334.47	06.82	21
40	906480.57	906775.22	1093224.78	999705.35	20
41	6588.52	6884.65	3115.35	03.87	19
42	6696.19	6993.81	3006.19	02.39	18
43	6803.60	7102.70	2897.30	999700.90	17
44	906910.74	7211.33	2788.67	999699.41	16
45	907017.61	7319.69	2680.31	97.92	15
46	124.21	7427.79	2572.21	96.42	14
47	230.55	7535.63	2464.37	94.92	13
48	336.63	7643.21	2356.79	93.42	12
49	442.44	7750.53	2249.47	91.91	11
50	907547.99	907857.60	1092142.40	999690.40	10
51	653.29	7964.41	2035.59	88.88	9
52	758.32	8070.96	1929.04	87.36	8
53	863.10	8177.26	1822.74	85.84	7
54	907967.62	8283.31	1716.69	84.31	6
55	908071.89	8389.11	1610.89	82.78	5
56	175.90	8494.66	1505.34	81.25	4
57	279.66	8599.96	1400.04	79.71	3
58	383.17	8705.01	1294.99	78.17	2
59	486.43	8809.81	1190.19	76.62	1
60	908589.45	908914.38	1091085.62	999675.07	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	83

7	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	908589.45	908914.38	1091085.62	999675.07	60
1	692.21	909018.69	1090981.31	73.52	59
2	794.73	122.77	877.23	71.96	58
3	897.00	226.60	773.40	70.40	57
4	908999.03	330.20	669.80	68.84	56
5	909100.82	433.55	566.45	67.27	55
6	202.37	536.67	463.33	65.70	54
7	303.67	639.55	360.45	64.12	53
8	404.74	742.19	257.81	62.54	52
9	505.56	844.60	155.40	60.96	51
10	909606.15	909946.78	1090053.22	999659.37	50
11	706.51	910048.72	1089951.28	57.78	49
12	806.62	150.44	849.56	56.19	48
13	909906.51	251.92	748.08	54.59	47
14	910006.16	353.17	646.83	52.99	46
15	105.58	454.20	545.80	51.38	45
16	204.77	555.00	445.00	49.77	44
17	303.73	655.57	344.43	48.16	43
18	402.46	755.91	244.09	46.55	42
19	500.96	856.04	143.96	44.93	41
20	910599.24	910955.94	1089044.06	999643.30	40
21	697.29	911055.62	1088944.38	41.67	39
22	795.12	155.08	844.92	40.04	38
23	892.72	254.31	745.69	38.41	37
24	910990.10	353.33	646.67	36.77	36
25	911087.26	452.13	547.87	35.13	35
26	184.20	550.72	449.28	33.48	34
27	280.92	649.09	350.91	31.83	33
28	377.42	747.24	252.76	30.18	32
29	473.70	845.18	154.82	28.52	31
30	911569.77	911942.91	1088057.09	999626.86	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	

7	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
30	911569.77	911942.91	1088057.09	999626.86	30
31	665.62	912040.43	1087959.57	25.19	29
32	761.25	137.73	802.27	23.52	28
33	856.67	234.82	765.18	21.85	27
34	911951.88	331.71	668.29	20.17	26
35	912046.88	428.39	571.61	18.49	25
36	141.67	524.86	475.14	16.81	24
37	236.21	621.12	378.88	15.12	23
38	330.6	717.18	282.82	13.43	22
39	424.77	813.03	186.97	11.74	21
40	912518.72	912908.68	1087091.32	999610.04	20
41	612.46	913004.13	1086995.87	08.34	19
42	706.00	099.37	900.63	06.63	18
43	799.34	194.42	805.58	04.92	17
44	892.47	289.26	710.74	03.21	16
45	912985.39	383.91	616.09	999601.49	15
46	913078.12	478.35	521.65	999599.77	14
47	170.64	572.60	427.40	98.04	13
48	262.97	666.65	333.35	96.31	12
49	355.09	760.51	239.49	94.58	11
50	913447.02	913854.17	1086145.83	999592.84	10
51	538.75	913947.64	1086052.36	91.11	9
52	630.28	914040.92	1085959.08	89.36	8
53	721.61	134.00	866.00	87.61	7
54	812.75	226.89	773.11	85.86	6
55	903.70	319.59	680.41	84.11	5
56	913994.45	412.10	587.90	82.35	4
57	914085.01	504.42	495.58	80.59	3
58	175.37	596.55	403.45	78.82	2
59	265.55	688.50	311.50	77.05	1
60	914355.53	914780.25	1085219.75	999575.28	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	82

8	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	914355.53	914780.25	1085219.75	999575.28	60
1	445.32	871.82	128.18	73.50	59
2	534.93	914963.21	1085036.79	71.72	8
3	624.35	915054.41	1084945.59	69.93	7
4	713.58	145.43	854.57	68.15	56
5	802.62	236.27	763.73	66.35	55
6	891.48	326.92	673.08	64.56	54
7	914980.15	417.39	582.61	62.76	53
8	915068.64	507.69	492.31	60.95	52
9	156.94	597.80	402.20	59.15	51
10	915245.07	915 87.73	1084312.27	999557.34	50
11	333.01	777.48	222.52	55.52	49
12	420.76	867.06	132.94	53.70	48
13	508.34	915956.46	1084043.54	51.88	47
14	595.74	916045.69	1083954.31	50.05	46
15	682.96	134.73	865.27	48.22	45
16	770.00	223.61	776.39	46.39	44
17	856.86	312.31	687.69	44.55	43
18	915943.54	400.83	599.17	42.71	42
19	916030.05	489.19	510.81	40.87	41
20	916116.39	916577.37	1083422.63	999539.02	40
21	202.54	665.38	334.62	37.17	39
22	288.53	753.22	246.78	35.31	38
23	374.34	840.89	159.11	33.45	37
24	459.98	916928.39	1083071.61	31.59	36
25	545.44	917015.72	1082984.28	29.72	35
26	630.74	102.89	897.11	27.85	34
27	715.86	189.89	810.11	25.97	33
28	800.81	276.72	723.28	24.09	32
29	885.59	363.38	636.62	22.21	31
30	916970.21	917449.88	1082550.12	999520.33	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	81

8	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us	
30	916970.21	917449.88	1082550.12	999520.33	30
31	917054.65	536.22	463.78	18.44	29
32	138.93	622.39	377.61	16.54	28
33	223.05	708.40	291.60	14.64	27
34	306.99	794.25	205.75	12.74	26
35	390.77	879.93	120.07	10.84	25
36	474.39	917965.46	1082034.54	08.93	24
37	557.84	918050.82	1081949.18	07.02	23
38	641.14	136.02	863.98	05.10	22
39	724.25	221.06	778.94	03.18	21
40	917807.21	918305.95	1081694.05	999501.26	20
41	890.01	390.68	609.32	999499.33	19
42	917972.65	475.25	524.75	97.40	18
43	918055.12	559.66	440.34	95.46	17
44	137.40	643.92	356.08	93.52	16
45	219.60	728.02	271.98	91.58	15
46	301.60	811.96	188.04	89.64	14
47	383.44	895.75	104.25	87.69	13
48	465.12	918979.39	1081020.61	85.73	12
49	546.65	919062.87	1080937.13	83.77	11
50	918628.02	919146.21	1080853.79	999481.81	10
51	709.23	229.39	770.61	79.85	9
52	790.29	312.41	687.59	77.88	8
53	871.20	395.29	604.71	75.91	7
54	918951.95	478.02	521.98	73.93	6
55	919032.53	560.59	439.41	71.95	5
56	112.99	643.02	356.98	69.97	4
57	193.28	725.30	274.70	67.98	3
58	273.42	807.43	192.57	65.99	2
59	353.41	889.41	110.59	63.99	1
60	919433.24	919971.25	1080028.75	999461.99	0
	Antilog-us	Anthapsol°	Hapsolog-us	Log-us.	81

9	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	919433.24	919971.25	1080028.75	999461.99	60
1	512.93	920052.94	1079947.06	59.99	59
2	592.47	134.49	865.51	57.98	58
3	671.86	215.88	784.12	55.97	57
4	751.10	297.14	702.86	53.96	56
5	830.19	378.25	621.75	51.94	55
6	909.13	459.22	540.78	49.92	54
7	919987.93	540.04	459.96	47.89	53
8	920066.58	620.72	379.28	45.87	52
9	145.09	701.26	298.74	43.83	51
10	920223.45	920781.65	1079218.35	999441.80	50
11	301.67	861.91	138.09	39.75	49
12	379.74	920942.03	1079057.97	37.71	48
13	457.66	921022.00	1078978.00	35.66	47
14	535.45	101.84	898.16	33.61	46
15	613.09	181.53	818.47	31.56	45
16	690.59	261.09	738.91	29.50	44
17	767.95	340.51	659.49	27.43	43
18	845.16	419.80	580.20	25.37	42
19	922.24	498.94	501.06	23.30	41
20	920999.17	921577.95	1078422.05	999421.22	40
21	921075.97	656.83	343.17	19.14	39
22	152.63	735.56	264.44	17.06	38
23	229.14	814.17	185.83	14.98	37
24	305.52	892.64	107.36	12.89	36
25	381.76	921970.97	1078029.03	10.79	35
26	457.87	922049.17	1077950.83	08.70	34
27	533.84	127.24	872.76	06.59	33
28	609.67	205.18	794.82	04.49	32
29	685.36	282.98	717.02	02.38	31
30	921760.92	922360.65	1077639.35	999400.27	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	80

9	Log-us.	Hapfolog-us.	Anthaplog-us.	Antilog-us	
30	921760.92	922360.65	1077639.35	999400.17	30
31	836.35	438.19	561.81	999398.15	29
32	911.64	515.61	484.39	96.03	28
33	921986.80	592.89	407.11	93.91	27
34	922061.82	670.04	329.96	91.78	26
35	136.71	747.06	252.94	89.65	25
36	211.47	823.95	176.05	87.52	24
37	286.09	900.71	099.29	85.38	23
38	360.59	922977.35	1077022.65	83.24	22
39	434.95	923053.86	1076946.14	81.09	21
40	922509.18	923130.24	1076869.76	999378.94	20
41	583.28	206.50	793.50	76.79	19
42	657.25	282.62	717.38	74.63	18
43	731.10	358.63	641.37	72.47	17
44	804.81	434.51	565.49	70.30	16
45	878.39	510.26	489.74	68.13	15
46	922951.85	585.89	414.11	65.96	14
47	923025.18	66139.	338.61	63.78	13
48	098.38	736.78	263.22	61.60	12
49	17145.	812.03	187.97	59.42	11
50	923244.40	923887.17	1076112.83	999357.23	10
51	317.22	923962.18	1076037.82	55.04	9
52	389.92	924037.08	1075962.92	52.85	8
53	462.49	111.85	888.15	50.65	7
54	534.94	186.50	813.50	48.44	6
55	607.26	261.03	738.97	46.24	5
56	679.46	335.43	664.57	44.03	4
57	751.53	409.72	590.28	41.81	3
58	823.49	483.89	516.11	39.59	2
59	895.32	557.94	442.06	37.37	1
60	923967.02	924631.88	1075368.12	999335.15	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	80

10	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	923967.02	924631.88	1075368.12	999335.15	60
1	924035.61	705.69	294.31	32.92	59
2	110.07	779.39	220.61	30.68	58
3	181.41	852.97	147.03	28.45	57
4	252.64	926.43	073.57	26.21	56
5	323.74	924999.78	1075000.22	23.96	55
6	394.72	925073.01	1074926.99	21.71	54
7	465.58	146.12	853.88	19.46	53
8	536.32	219.12	780.88	17.20	52
9	606.95	292.00	708.00	14.94	51
10	924677.46	925364.77	1074635.23	999312.68	50
11	747.84	437.43	562.57	10.41	49
12	818.11	509.97	490.03	08.14	48
13	888.27	582.40	417.60	05.87	47
14	924958.30	654.72	345.28	03.59	46
15	925028.22	726.92	273.08	999301.31	45
16	098.03	799.01	200.99	999299.02	44
17	167.72	870.99	129.01	96.73	43
18	237.29	925942.85	1074057.15	94.44	42
19	306.75	926014.61	1073985.39	92.14	41
20	925376.09	926086.25	1073913.75	999289.84	40
21	445.32	157.79	842.21	87.53	39
22	514.44	229.21	770.79	85.22	38
23	583.44	300.53	699.47	82.91	37
24	652.33	371.73	628.27	80.59	36
25	721.10	442.83	557.17	78.27	35
26	789.77	513.82	486.18	75.95	34
27	858.32	584.70	415.30	73.62	33
28	926.76	655.47	344.53	71.29	32
29	925995.09	726.13	273.87	68.95	31
30	926063.30	916796.69	1073203.31	999266.61	30
	Antilog us.	Anthapfol.	Hapfolog-us	Log-us.	79

10	Log-us.	Hapfolog-us	Anthapfolog-us.	Antilog-us	
30	926663.30	926796.69	1073203.31	999166.61	30
31	131.41	867.14	132.86	64.27	29
32	199.41	926937.49	1073062.51	61.92	28
33	267.29	927007.72	1072992.28	59.57	27
34	335.07	077.86	922.14	57.22	26
35	402.74	147.88	852.12	54.86	25
36	470.30	217.80	782.20	52.50	24
37	537.75	287.62	712.38	50.13	23
38	605.09	357.33	642.6	47.76	22
39	672.32	426.94	573.06	45.39	21
40	926739.45	927496.44	1072503.56	999243.01	20
41	806.47	565.84	434.16	40.63	19
42	873.38	635.14	364.86	38.24	18
43	926940.19	704.34	295.66	35.85	17
44	927006.89	773.43	226.57	33.46	16
45	073.48	842.42	157.58	31.06	15
46	139.97	911.31	088.69	28.66	14
47	206.35	927980.09	1072019.91	26.26	13
48	272.63	928048.78	1071951.22	23.85	12
49	338.80	117.36	882.64	21.44	11
50	927404.87	928185.85	1071814.15	999219.02	10
51	470.83	254.23	745.77	16.60	9
52	536.69	322.51	677.49	14.18	8
53	602.45	390.70	609.30	11.75	7
54	668.11	458.78	541.22	09.32	6
55	733.66	526.77	473.23	06.89	5
56	799.11	594.66	405.34	04.45	4
57	864.45	662.45	337.55	999202.01	3
58	929.70	730.14	269.86	999199.56	2
59	927994.84	797.73	202.27	97.11	1
60	928059.88	928865.23	1071134.77	999194.66	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	79

11	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
0	928059.88	928865.23	1071134.77	999194.66	60
1	124.83	932.63	067.37	92.20	59
2	189.67	928999.93	1071000.07	89.74	58
3	254.41	929067.13	1070932.87	87.27	57
4	319.05	134.24	865.76	84.80	56
5	383.59	201.26	798.74	82.33	55
6	448.03	268.17	731.83	79.86	54
7	512.37	335.00	665.00	77.37	53
8	576.61	401.72	598.28	74.89	52
9	640.76	468.36	531.64	72.40	51
10	928704.80	929534.89	1070465.11	999169.91	50
11	768.75	601.34	398.66	67.41	49
12	832.60	667.69	332.3	64.92	48
13	896.36	733.95	266.05	62.41	47
14	928960.01	800.11	199.89	59.90	46
15	929023.57	866.18	133.82	57.39	45
16	087.04	932.16	067.84	54.88	44
17	150.40	929998.04	1070001.96	52.36	43
18	213.67	930063.83	1069936.17	49.84	42
19	276.85	129.54	870.46	47.31	41
20	929339.93	930195.14	1069804.86	999144.78	40
21	402.91	260.66	739.34	42.25	39
22	465.80	326.09	673.91	39.71	38
23	528.59	391.43	608.57	37.17	37
24	591.29	456.67	543.33	34.62	36
25	653.90	521.83	478.17	32.07	35
26	716.41	586.89	413.11	29.52	34
27	778.83	651.87	348.13	26.96	33
28	841.16	716.75	283.25	24.40	32
29	903.39	781.55	218.45	21.84	31
30	929965.53	930846.26	1069153.74	999119.27	30
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	78

11	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
30	929965 53	930846.26	1069153.74	999119.27	30
31	930027.58	910.88	089.12	16.70	29
32	089.53	930975.41	1069024.59	14.12	28
33	151.40	931039.85	1068960.15	11.54	27
34	213.17	104.21	895.79	08.96	26
35	274.85	168.48	831.52	06.37	25
36	336.44	232.66	767.34	03.78	24
37	397.94	296.75	703.25	999101.19	23
38	459.34	360.76	639.24	999098.59	22
39	520.66	424.68	575.32	95.98	21
40	930581.89	931488.51	1068511.49	999093.38	20
41	643.03	552.26	447.74	90.77	19
42	704.07	615.92	384.08	88.15	18
43	765.03	679.50	320.50	85.53	17
44	825.90	742.99	257.01	82.91	16
45	886.68	806.40	193.60	80.29	15
46	930947.37	869.72	130.28	77.66	14
47	931007.98	932.95	067.05	75.02	13
48	068.49	931996.11	1068003.89	72.39	12
49	128.92	932059.18	1067940.82	69.74	11
50	931189.26	932122.16	1067877.84	999067.10	10
51	249.51	185.06	814.94	64.45	9
52	309.68	247.88	752.12	61.80	8
53	369.76	310.61	689.39	59.14	7
54	429.75	371.27	626.73	56.48	6
55	489.65	435.84	564.16	53.82	5
56	549.47	498.32	501.68	51.15	4
57	609.21	560.73	439.27	48.48	3
58	668.85	623.05	376.95	45.80	2
59	728.41	685.29	314.71	43.12	1
60	931787.89	932747.45	1067252.55	999040.44	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	78

Li	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	931787.89	932747.45	1067252.55	999040.44	60
1	847.28	809.53	190.47	37.75	59
2	906.59	871.53	128.47	35.06	58
3	931965.81	933.45	066.55	32.37	57
4	932024.95	932995.28	1067004.72	29.67	56
5	084.00	933057.04	1066942.96	26.97	55
6	142.97	118.72	881.28	24.26	54
7	201.86	180.31	819.69	21.55	53
8	260.66	241.83	758.17	18.83	52
9	319.38	303.27	696.73	16.12	51
10	932378.02	933364.63	1066635.37	999013.39	50
11	436.57	425.91	574.09	10.67	49
12	495.05	487.11	512.89	07.94	48
13	553.44	548.23	451.77	05.21	47
14	611.74	609.27	390.73	999002.47	46
15	669.97	670.24	329.76	998999.73	45
16	728.11	731.13	268.87	96.98	44
17	786.17	791.94	208.06	94.23	43
18	844.16	852.67	147.33	91.48	42
19	902.06	913.33	086.67	88.73	41
20	932959.88	933973.91	1066026.09	998985.97	40
21	933017.61	934034.41	1065965.59	83.20	39
22	075.27	094.84	905.16	80.43	38
23	132.85	155.19	844.81	77.66	37
24	190.35	215.46	784.54	74.89	36
25	247.77	275.66	724.34	72.11	35
26	305.11	335.78	664.22	69.32	34
27	362.37	395.83	604.17	66.54	33
28	419.55	455.80	544.20	63.74	32
29	476.65	515.70	484.30	60.95	31
30	933533.68	934575.52	1065424.48	998958.15	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	77

13	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	933533.68	934575.52	1065424.48	998958.15	30
31	590.62	635.27	364.73	55.35	29
32	647.49	694.94	305.06	52.54	28
33	704.28	754.54	245.46	49.73	27
34	760.99	814.07	185.93	40.92	26
35	817.62	873.52	126.48	44.10	25
36	874.18	932.90	067.10	41.28	24
37	930.65	934992.20	1065007.80	38.45	23
38	933987.06	935051.43	1064948.57	35.62	22
39	934043.38	110.59	889.41	32.79	21
40	934099.63	935169.68	1064830.32	998929.95	20
41	155.80	228.69	771.31	27.11	19
42	211.90	287.63	712.37	24.27	18
43	267.92	346.50	653.50	21.42	17
44	323.86	405.30	594.70	18.56	16
45	379.73	464.02	535.98	15.71	15
46	435.52	522.67	477.33	12.85	14
47	491.24	581.26	418.74	09.98	13
48	546.88	639.77	360.23	07.11	12
49	602.45	698.21	301.79	04.24	11
50	934657.94	935756.58	1064243.42	998901.37	10
51	713.36	814.87	185.13	998898.49	9
52	768.70	873.10	126.90	95.60	8
53	823.97	931.26	068.74	92.71	7
54	879.17	935989.35	1064010.65	89.82	6
55	934.29	936047.36	1063952.64	86.93	5
56	934989.34	105.31	894.69	84.03	4
57	935044.32	163.19	836.81	81.13	3
58	099.22	221.00	779.00	78.22	2
59	154.05	278.74	721.26	75.31	1
60	935208.80	936336.41	1063663.59	998872.39	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	77

	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	935208.80	936336.41	1063663.59	998872.39	60
1	263.49	394.01	605.99	69.47	59
2	318.10	451.55	548.45	66.55	58
3	372.64	509.01	490.99	63.63	57
4	427.10	566.41	433.59	60.70	56
5	481.50	623.74	376.26	57.76	55
6	535.82	681.00	319.00	54.82	54
7	590.07	738.19	261.81	51.88	53
8	644.26	795.32	204.68	48.94	52
9	698.36	852.38	147.62	45.99	51
10	935752.40	936909.37	1063090.63	998843.03	50
11	806.37	936966.29	1063033.71	40.08	49
12	860.27	937023.15	1062976.85	37.12	48
13	914.09	079.94	920.06	34.15	47
14	935967.85	136.67	863.33	31.18	46
15	936021.54	193.33	806.67	28.21	45
16	075.15	249.92	750.08	25.23	44
17	128.70	306.45	693.55	22.25	43
18	182.17	362.91	637.09	19.27	42
19	235.58	419.30	580.70	16.28	41
20	936288.92	937475.63	1062524.37	998813.29	40
21	342.19	531.90	468.10	10.29	39
22	395.39	588.10	411.90	07.29	38
23	448.52	644.23	355.77	04.29	37
24	501.58	700.30	299.70	998801.28	36
25	554.58	756.31	243.69	998798.27	35
26	607.50	812.25	187.75	95.25	34
27	660.36	868.13	131.87	92.23	33
28	713.15	923.94	076.06	89.21	32
29	765.87	937979.69	1062020.31	86.18	31
30	936818.53	938035.37	1061964.63	998783.15	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	76

13	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	936818.53	938035.37	1061964.63	998783.15	30
31	871.11	091.00	909.00	80.12	29
32	923.63	146.55	853.45	77.08	28
33	936976.08	202.05	797.95	74.04	27
34	937028.47	257.48	742.52	70.99	26
35	080.79	312.85	687.15	67.94	25
36	133.04	368.16	631.84	64.88	24
37	185.23	423.40	576.60	61.83	23
38	237.35	478.58	521.42	58.76	22
39	289.40	533.70	466.30	55.70	21
40	937341.39	938588.76	1061411.24	998752.63	20
41	393.31	643.76	356.24	49.55	19
42	445.17	698.69	301.31	46.48	18
43	496.96	753.56	246.44	43.39	17
44	548.68	808.37	191.63	40.31	16
45	600.34	863.12	136.88	37.22	15
46	651.94	917.81	082.19	34.13	14
47	703.47	938972.44	1061027.56	31.03	13
48	754.93	939027.00	1060973.00	27.93	12
49	806.33	081.51	918.49	24.82	11
50	937857.67	939135.95	1060864.05	998721.71	10
51	908.94	190.34	809.66	18.60	9
52	937960.15	244.66	755.34	15.49	8
53	938011.29	298.93	701.07	12.36	7
54	062.37	353.13	646.87	09.24	6
55	113.39	407.27	592.73	06.11	5
56	164.34	461.36	538.64	998702.98	4
57	215.23	515.38	484.62	998699.84	3
58	266.05	569.35	430.65	96.70	2
59	316.82	623.26	376.74	93.56	1
60	938367.52	939677.11	1060322.89	998690.41	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	76

14	Log-us.	Hapſolog-us.	Anthapſolog-us.	Antilog-us	
0	938367.52	939677.11	1060322.89	998690.41	60
1	418.15	730.89	269.11	87.26	59
2	468.73	784.63	215.37	84.10	58
3	519.24	838.30	161.70	80.94	57
4	569.69	891.91	108.09	77.78	56
5	620.08	945.47	054.53	74.61	55
6	670.40	939998.96	1060001.04	71.44	54
7	720.67	940052.40	1059947.60	68.27	53
8	770.87	105.78	894.22	65.09	52
9	821.01	159.10	840.90	61.91	51
10	938871.09	940212.37	1059787.63	998658.72	50
11	921.11	265.58	734.42	55.53	49
12	938971.06	318.73	681.27	52.33	48
13	939020.96	371.82	628.18	49.13	47
14	070.79	424.86	575.14	45.93	46
15	120.57	477.84	522.16	42.73	45
16	170.28	530.76	469.24	39.52	44
17	219.93	583.63	416.37	36.30	43
18	269.52	636.44	363.56	33.08	42
19	319.05	689.19	310.81	29.86	41
20	939368.52	940741.89	1059258.11	998626.63	40
21	417.94	794.53	205.47	23.40	39
22	467.29	847.11	152.88	20.17	38
23	516.58	899.65	100.35	16.93	37
24	565.81	940952.12	1059047.88	13.69	36
25	614.99	941004.54	1058995.46	10.45	35
26	664.10	056.90	943.10	07.20	34
27	713.15	109.21	890.79	03.94	33
28	762.15	161.46	838.54	998600.69	32
29	811.09	213.66	786.34	998597.42	31
30	939859.96	941265.81	1058734.19	998594.16	30
	Antilog-us	Anthapſol.	Hapſolog-us	Log-us.	75

4	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	9398 59.96	941265.81	1058734.19	998594.16	30
31	908.78	317.89	682.11	90.89	29
32	939957.54	369.93	630.07	87.62	28
33	940006.25	421.91	578.09	84.34	27
34	054.89	473.83	526.17	81.06	26
35	103.48	525.70	474.30	77.77	25
36	152.01	577.52	422.48	74.49	24
37	200.48	629.28	370.72	71.19	23
38	248.89	680.99	319.01	67.90	22
39	297.24	732.65	267.35	64.60	21
40	940345.54	941784.25	1058215.75	998561.29	20
41	393.78	835.80	164.20	57.98	19
42	441.96	887.29	112.71	54.67	18
43	490.09	938.74	061.26	51.35	17
44	538.16	941990.13	1058009.87	48.03	16
45	586.17	942041.46	1057958.54	44.71	15
46	634.13	092.75	907.25	41.38	14
47	682.03	143.98	856.02	38.05	13
48	729.87	195.15	804.85	34.71	12
49	777.66	246.28	753.72	31.38	11
50	940825.39	942297.35	1057702.65	998528.03	10
51	873.06	348.38	651.62	24.68	9
52	920.68	399.35	600.65	21.33	8
53	940968.24	450.26	549.74	17.98	7
54	941015.75	501.13	498.87	14.62	6
55	063.20	551.94	448.06	11.25	5
56	110.59	602.71	397.29	07.89	4
57	157.93	653.42	346.58	04.52	3
58	205.22	704.08	295.92	998501.14	2
59	252.45	754.69	245.31	998497.76	1
60	941299.62	942805.25	1057194.75	998494.38	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	75

15	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
0	941299.62	942805.25	1057194.75	998494.38	60
1	346.74	855.75	144.25	90.99	59
2	393.81	906.21	093.79	87.60	58
3	440.82	942956.61	1057043.39	84.20	57
4	487.78	943006.97	1056993.03	80.81	56
5	534.68	057.27	942.73	77.40	55
6	581.52	107.53	892.47	74.00	54
7	628.32	157.73	842.27	70.59	53
8	675.06	207.89	792.11	67.17	52
9	721.74	257.99	742.01	63.75	51
10	941768.37	943308.04	1056691.96	998460.33	50
11	814.95	358.05	641.95	56.90	49
12	861.48	408.00	592.00	53.47	48
13	907.95	457.91	542.09	50.04	47
14	941954.36	507.76	492.24	46.60	46
15	942000.73	557.57	442.43	43.16	45
16	047.04	607.33	392.67	39.71	44
17	093.30	657.04	342.96	36.26	43
18	139.50	706.70	293.30	32.81	42
19	185.66	756.31	243.69	29.35	41
20	942231.76	943805.87	1056194.13	998425.89	40
21	277.80	855.38	144.62	22.42	39
22	323.80	904.85	095.15	18.95	38
23	369.74	943954.20	1056045.74	15.48	37
24	415.63	944003.63	1055996.37	12.00	36
25	461.47	052.95	947.05	08.52	35
26	507.26	102.22	897.78	05.03	34
27	552.99	151.45	848.55	998401.54	33
28	598.67	200.62	799.38	998398.05	32
29	644.30	249.75	750.25	94.55	31
30	941689.88	944298.83	1055701.17	998391.05	30
	Antilog-us.	Anthapsol.	Hapsolog-us	Log-us.	74

15	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us.	
30	942689.88	944298.83	1055701.17	998391.05	30
31	735.41	347.86	652.14	87.55	29
32	780.89	396.85	603.15	84.04	28
33	826.31	445.79	554.21	80.52	27
34	871.69	494.68	505.32	77.01	26
35	917.01	543.52	456.48	73.48	25
36	942962.28	592.32	407.68	69.96	24
37	943007.50	641.07	358.93	60.43	23
38	052.67	689.78	310.22	62.90	22
39	097.79	738.43	261.57	59.36	21
40	943142.86	944787.04	1055212.96	998355.82	20
41	187.88	835.61	164.39	52.27	19
42	232.85	884.13	115.87	48.72	18
43	277.77	932.60	067.40	45.17	17
44	322.64	944981.02	1055018.98	41.61	16
45	367.46	945029.40	1054970.60	38.05	15
46	412.23	077.74	922.26	34.49	14
47	456.94	126.02	873.98	30.92	13
48	501.61	174.27	825.73	27.35	12
49	546.23	222.46	777.54	23.77	11
50	943590.80	945270.61	1054729.39	998320.19	10
51	635.32	318.72	681.28	16.61	9
52	679.80	366.78	633.22	13.02	8
53	724.22	414.79	585.21	09.42	7
54	768.59	462.76	537.24	05.83	6
55	812.92	510.69	489.31	998302.23	5
56	857.19	558.57	441.43	998298.62	4
57	901.42	606.41	393.59	95.01	3
58	945.60	654.20	345.80	91.40	2
59	943989.73	701.94	298.06	87.78	1
60	944033.81	945749.64	1054250.36	998284.16	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	74

16	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	944033.81	945749.64	1054250.36	998284.16	60
1	077.84	797.30	202.70	80.54	59
2	121.82	844.91	155.09	76.91	58
3	165.76	892.48	107.52	73.28	57
4	209.65	940.01	059.99	69.64	56
5	253.49	945987.49	1054012.51	66.00	55
6	297.28	946034.92	1053965.08	62.36	54
7	341.03	082.32	917.68	58.71	53
8	384.72	129.67	870.33	55.06	52
9	428.37	176.97	823.03	51.40	51
10	944471.97	946224.23	1053775.77	998247.74	50
11	515.53	271.45	728.55	44.08	49
12	559.04	318.63	681.37	40.41	48
13	602.50	365.76	634.24	36.74	47
14	645.91	412.85	587.15	33.06	46
15	689.27	459.90	540.10	29.38	45
16	732.59	506.90	493.10	25.69	44
17	775.86	553.86	446.14	22.01	43
18	819.09	600.78	399.22	18.31	42
19	862.27	647.65	352.35	14.62	41
20	944905.40	946694.48	1053305.52	998210.92	40
21	948.49	741.27	258.73	07.21	39
22	944991.53	788.02	211.98	998203.51	38
23	945034.52	834.73	165.27	998199.79	37
24	077.47	881.39	118.61	96.08	36
25	120.37	928.01	071.99	92.36	35
26	163.22	946974.59	1053025.41	88.63	34
27	206.03	947021.12	1052978.88	84.90	33
28	248.79	067.62	932.38	81.17	32
29	291.51	114.07	885.93	77.44	31
30	945334.18	947160.48	1052839.52	998173.70	30
	Antilog us	Anthapfol.	Hapfolog-us	Log-us.	73

16	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
30	945334.18	947160.48	1052839.52	998173.70	30
31	376.81	206.85	793.15	69.95	29
32	419.39	253.18	746.82	66.20	28
33	461.92	299.47	700.53	62.45	27
34	504.41	345.72	654.28	58.70	26
35	546.86	391.92	608.08	54.94	25
36	589.26	438.08	561.92	51.17	24
37	631.61	484.21	515.79	47.40	23
38	673.92	530.29	469.71	43.63	22
39	716.18	576.33	423.67	39.86	21
40	945758.40	947622.33	1052377.67	998136.08	20
41	800.58	668.29	331.71	32.29	19
42	842.71	714.21	285.79	28.50	18
43	884.80	760.09	239.91	24.71	17
44	926.84	805.92	194.08	20.91	16
45	945968.84	851.72	148.28	17.11	15
46	946010.79	897.48	102.52	13.31	14
47	052.70	943.19	056.81	09.50	13
48	094.56	947988.87	1052011.13	05.69	12
49	136.38	948034.51	1051965.49	998101.87	11
50	946178.16	948080.11	1051919.89	998098.05	10
51	219.89	125.66	874 34	94.23	9
52	261.58	171.18	828.82	90.40	8
53	303.23	216.66	783.34	86.57	7
54	344.83	262.10	737.90	82.73	6
55	386.39	307.50	692.50	78.89	5
56	427.90	352.86	647.14	75.05	4
57	469.38	398.18	601.82	71.20	3
58	510.81	443.46	556.54	67.35	2
59	552.19	488.70	511.30	63.49	1
60	946593.53	948533.90	1051466.10	998059.63	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	73

17	Log-us.	Hapfolo. g-us.	Anthapfo-log-us.	Antilog-us	
0	946593.53	948533.90	1051466.10	998059.63	60
1	634.83	579.07	420.93	55.77	59
2	676.09	624.19	375.81	51.90	58
3	717.30	669.28	330.72	48.03	57
4	758.48	714.33	285.67	44.15	56
5	799.60	759.33	240.67	40.27	55
6	840.69	804.30	195.70	36.39	54
7	881.73	849.24	150.76	32.50	53
8	922.73	894.13	105.87	28.60	52
9	946963.69	938.98	061.02	24.71	51
10	947004.61	948983.80	1051016.20	998020.81	50
11	045.48	949028.58	1050971.42	16.90	49
12	086.31	073.32	926.68	12.99	48
13	127.10	118.02	881.98	09.08	47
14	167.85	162.69	837.31	05.16	46
15	208.56	207.31	792.69	998001.24	45
16	249.22	251.90	748.10	997997.32	44
17	289.85	296.46	703.54	93.39	43
18	330.43	340.97	659.03	89.46	42
19	370.97	385.45	614. 55	85.52	41
20	947411.46	949429.88	1050570.12	997981.58	40
21	451.92	474.29	525.71	77.64	39
22	492.34	518.65	481.35	73.69	38
23	532.71	562.98	437.02	69.73	37
24	573.04	607.27	392.73	65.78	36
25	613.34	651.52	348.48	61.82	35
26	653.59	695.74	304.26	57.85	34
27	693.80	739.91	260.09	53.88	33
28	733.96	784.06	215.94	49.91	32
29	774.09	828.16	171.84	45.93	31
30	947814.18	949872.23	1050127.77	997941.95	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	72

17	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	947814.18	949872.23	1050127.77	997941.95	30
31	854.23	916.26	083.74	37.96	29
32	894.23	949960.26	1050039.74	33.98	28
33	934.20	950004.22	1049995.78	29.98	27
34	947974.12	048.14	951.86	25.98	26
35	948014.01	092.03	907.97	21.98	25
36	053.85	135.88	864.12	17.98	24
37	093.66	179.69	820.31	13.97	23
38	133.42	223.47	776.53	09.96	22
39	173.15	267.21	732.79	05.94	21
40	948212.83	950310.92	1049689.08	997901.92	20
41	252.48	354.59	645.41	997897.89	19
42	292.08	398.22	601.78	93.86	18
43	331.65	441.82	558.18	89.83	17
44	371.17	485.38	514.62	85.79	16
45	410.66	528.91	471.09	81.75	15
46	450.10	572.40	427.60	77.70	14
47	489.51	615.86	384.14	73.65	13
48	528.88	659.28	340.72	69.60	12
49	568.20	702.67	297.33	65.54	11
50	948607.49	950746.02	1049253.98	997861.48	10
51	646.74	789.33	210.67	57.41	9
52	685.95	832.61	167.39	53.34	8
53	725.12	875.86	124.14	49.27	7
54	764.26	919.07	080.93	45.19	6
55	803.35	950962.24	1049037.76	41.11	5
56	842.40	951005.39	1048994.61	37.02	4
57	881.42	048.49	951.51	32.93	3
58	920.40	091.56	908.44	28.83	2
59	959.34	134.60	865.40	24.74	1
60	948998.24	951177.60	1048822.40	997820.63	0
	Antilog-us	Anthapfol.	Hapfolog-us.	Log-us.	72

18	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	948998.24	951177.60	1048822.40	997820.63	60
1	949037.10	220.57	779.43	16.53	59
2	075.92	263.51	736.49	12.41	58
3	114.71	306.41	693.59	08.30	57
4	153.45	349.27	650.73	04.18	56
5	192.16	392.10	607.90	997800.06	55
6	230.83	434.90	565.10	997795.93	54
7	269.46	477.66	522.34	91.80	53
8	308.06	520.39	479.61	87.66	52
9	346.61	563.09	436.91	83.53	51
10	949385.13	951605.75	1048394.25	997779.38	50
11	423.61	648.38	351.62	75.23	49
12	462.05	690.97	309.03	71.08	48
13	500.46	733.53	266.47	66.93	47
14	538.83	776.06	223.94	62.77	46
15	577.16	818.55	181.45	58.60	45
16	615.45	861.01	138.99	54.44	44
17	653.70	903.44	096.56	50.26	43
18	691.92	945.83	054.17	46.09	42
19	730.10	951988.19	1048011.81	41.91	41
20	949768.24	952030.52	1047969.48	997737.72	40
21	806.35	072.82	927.18	33.54	39
22	844.42	115.08	884.92	29.34	38
23	882.45	157.30	842.70	25.15	37
24	920.45	199.50	800.50	20.97	36
25	958.40	241.66	758.34	16.74	35
26	949996.33	283.79	716.21	12.53	34
27	950034.21	325.89	674.11	08.32	33
28	072.06	367.95	632.05	997704.10	32
29	109.87	409.99	590.01	997699.88	31
30	950147.64	952451.99	1047548.01	997695.66	30
	Antilog-us	Anthapfol	Hapfolog-us	Log-us.	71

18	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	950147.64	952451.99	1047548.01	997695.66	30
31	185.38	493.95	506.05	91.43	29
32	223.08	535.89	464.11	87.20	28
33	260.75	577.79	422.21	82.96	27
34	298.38	619.66	380.34	78.72	26
35	335.97	661.50	338.50	74.47	25
36	373.53	703.31	296.69	70.22	24
37	411.05	745.08	254.92	65.97	23
38	448.53	786.82	213.18	61.71	22
39	485.98	828.53	171.47	57.45	21
40	950523.39	952870.21	1047129.79	997653.18	20
41	560.77	911.86	088.14	48.91	19
42	598.11	953.47	046.53	44.64	18
43	635.42	952995.05	1047004.95	40.36	17
44	672.69	953036.61	1046963.39	36.08	16
45	709.92	078.13	921.87	31.79	15
46	747.12	119.61	880.39	27.50	14
47	784.28	161.07	838.93	23.21	13
48	821.41	202.50	797.50	18.91	12
49	858.50	243.89	756.11	14.61	11
50	950895.56	953285.26	1046714.74	997610.30	10
51	932.58	326.59	673.41	05.99	9
52	950969.56	367.89	632.11	997601.67	8
53	951006.51	409.16	590.84	997597.36	7
54	043.43	450.40	549.60	93.03	6
55	080.31	491.61	508.39	88.70	5
56	117.16	532.78	467.22	84.37	4
57	153.97	573.93	426.07	80.04	3
58	190.74	615.05	384.95	75.70	2
59	227.49	656.13	343.87	71.35	1
60	951264.19	953697.19	1046302.81	997567.01	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	71

19	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	951264.19	953697.19	1046302.81	997567.01	60
1	300.86	738.21	261.79	62.65	59
2	337.50	779.20	220.80	58.30	58
3	374.10	820.17	179.83	53.94	57
4	410.67	861.10	138.90	49.57	56
5	447.21	902.00	098.00	45.21	55
6	483.71	942.87	057.13	40.83	54
7	520.17	953983.71	1046016.29	36.46	53
8	556.60	954024.53	1045975.47	32.08	52
9	593.00	065.31	934.69	27.69	51
10	951629.36	954106.06	1045893.94	997523.30	50
11	665.69	146.78	853.22	18.91	49
12	701.98	187.47	812.53	14.51	48
13	738.24	228.13	771.87	10.11	47
14	774.47	268.77	731.23	05.70	46
15	810.66	309.37	690.63	997501.29	45
16	846.82	349.94	650.06	997496.88	44
17	882.95	390.48	609.52	92.46	43
18	919.04	431.00	569.00	88.04	42
19	955.10	471.48	528.52	83.61	41
20	951991.12	954511.93	1045488.07	997479.18	40
21	952027.11	552.36	447.64	74.75	39
22	063.07	592.76	407.24	70.31	38
23	098.99	633.12	366.88	65.87	37
24	134.88	673.46	326.54	61.42	36
25	170.74	713.77	286.23	56.97	35
26	206.56	754.05	245.95	52.52	34
27	242.35	794.30	205.70	48.06	33
28	278.11	834.52	165.48	43.59	32
29	313.83	874.71	125.29	39.13	31
30	952349.53	954914.87	1045085.13	997434.66	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	70

19	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	952349.53	954914.87	1045085.13	997434.66	30
31	385.18	955.00	045.00	30.18	29
32	420.81	954995.11	1045004.89	25.70	28
33	456.40	955035.19	1044964.81	21.22	27
34	491.96	075.23	924.77	16.73	26
35	527.49	115.25	884.75	12.24	25
36	562.98	155.24	844.76	07.74	24
37	598.44	195.21	804.79	997403.24	23
38	633.87	235.14	764.86	997398.73	22
39	669.27	275.04	724.96	94.22	21
40	952704.63	955314.92	1044685.08	997389.71	20
41	739.97	354.77	645.23	85.19	19
42	775.26	394.59	605.41	80.67	18
43	810.53	434.38	565.62	76.15	17
44	845.77	474.15	525.85	71.62	16
45	880.97	513.88	486.12	67.09	15
46	916.14	553.59	446.41	62.55	14
47	951.28	593.27	406.73	58.01	13
48	952986.38	632.92	367.08	53.46	12
49	953021.46	672.55	327.45	48.91	11
50	953056.50	955712.14	1044287.86	997344.35	10
51	091.51	751.71	248.29	39.80	9
52	126.49	791.25	208.75	35.23	8
53	161.43	830.77	169.23	30.67	7
54	196.35	870.25	129.75	26.10	6
55	231.23	909.71	090.29	21.52	5
56	266.08	949.14	050.86	16.94	4
57	300.90	955988.54	1044011.46	12.36	3
58	335.69	956027.92	1043972.08	07.77	2
59	370.44	067.27	932.73	997303.18	1
60	953405.17	956106.59	1043893.41	997298.58	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	70

20	Log-us.	Hapſolog-us.	Anthapſolog-us.	Antilog-us	
0	953405.17	956106.59	1043893.41	997298.58	60
1	439.86	145.88	854.12	93.98	59
2	474.51	185.15	814.85	89.38	58
3	509.15	224.39	775.61	84.77	57
4	543.75	263.60	736.40	80.16	56
5	578.32	302.78	697.22	75.54	55
6	612.86	341.94	658.06	70.92	54
7	647.37	381.07	618.93	66.29	53
8	681.84	420.18	579.82	61.66	52
9	716.28	459.25	540.75	57.03	51
10	953750.70	956498.31	1043501.69	997252.39	50
11	785.08	537.33	462.67	47.75	49
12	819.43	576.33	423.67	43.10	48
13	853.75	615.30	384.70	38.45	47
14	888.04	654.24	345.76	33.80	46
15	922.30	693.16	306.84	29.14	45
16	956.53	732.05	267.95	24.48	44
17	953990.73	770.91	229.09	19.81	43
18	954024.89	809.75	190.25	15.14	42
19	059.03	848.56	151.44	10.47	41
20	954093.14	956887.35	1043112.65	997205.79	40
21	127.21	926.11	073.89	997201.10	39
22	161.26	956964.84	1043035.16	997196.42	38
23	195.27	957003.55	1042996.45	91.72	37
24	229.26	042.23	957.77	87.03	36
25	263.21	080.88	919.12	82.33	35
26	297.13	119.51	880.49	77.02	34
27	331.03	158.11	841.89	72.91	33
28	364.89	196.69	803.31	68.20	32
29	398.73	235.24	764.76	63.48	31
30	954432.53	957273.77	1042726.23	997158.76	30
	Antilog-us	Anthapſol.	Hapſolog-us	Log-us.	69

20	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	954432.53	957273.77	1042726.23	997158.76	30
31	466.30	312.27	687.73	54.04	29
32	500.05	350.74	649.26	49.31	28
33	533.76	389.19	610.81	44.57	27
34	567.45	427.61	572.39	39.84	26
35	601.10	466.01	533.99	35.09	25
36	634.72	504.38	495.62	30.35	24
37	668.32	542.72	457.28	25.60	23
38	701.89	581.04	418.96	20.84	22
39	735.42	619.34	380.66	16.08	21
40	954768.93	957657.61	1042342.39	997111.32	20
41	802.40	695.85	304.15	06.55	19
42	835.85	734.07	265.93	997101.78	18
43	869.27	772.26	227.74	997097.01	17
44	902.66	810.43	189.57	92.23	16
45	936.02	848.58	151.42	87.44	15
46	954969.35	886.69	113.31	82.65	14
47	955002.65	924.79	075.21	77.86	13
48	035.92	957962.86	1042037.14	73.06	12
49	069.16	958000.90	1041999.10	68.26	11
50	955102.37	958038.92	1041961.08	997063.46	10
51	135.56	076.91	923.09	58.65	9
52	168.71	114.88	885.12	53.83	8
53	201.84	152.82	847.18	49.02	7
54	234.94	190.74	809.26	44.19	6
55	268.01	228.64	771.36	39.37	5
56	301.05	266.51	733.49	34.54	4
57	334.06	304.35	695.65	29.70	3
58	367.04	342.17	657.83	24.86	2
59	399.99	379.97	620.03	20.02	1
60	955432.92	958417.74	1041582.26	997015.17	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	69

21	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	955432.92	958417.74	1041582.26	997015.17	60
1	465.81	455.49	544.51	10.32	59
2	498.68	493.21	506.79	05.47	58
3	531.52	530.91	469.09	997000.61	57
4	564.33	568.59	431.41	996995.74	56
5	597.11	606.24	393.76	90.87	55
6	629.87	643.86	356.14	86.00	54
7	662.59	681.47	318.53	81.12	53
8	695.29	719.04	280.96	76.24	52
9	727.96	756.60	243.40	71.36	51
10	955760.60	958794.13	1041205.87	996966.47	50
11	793.21	831.63	168.37	61.58	49
12	825.79	869.12	130.88	56.68	48
13	858.35	906.57	093.43	51.77	47
14	890.88	944.01	055.99	46.87	46
15	923.38	958981.42	1041018.58	41.96	45
16	955.85	959018.81	1040981.19	37.04	44
17	955988.29	056.17	943.83	32.12	43
18	956020.71	093.51	906.49	27.20	42
19	053.10	130.82	869.18	22.27	41
20	956085.46	959168.12	1040831.88	996917.34	40
21	117.79	205.39	794.61	12.41	39
22	150.10	242.63	757.37	07.46	38
23	182.37	279.85	720.15	996902.52	37
24	214.62	317.05	682.95	996897.57	36
25	246.85	354.23	645.77	92.62	35
26	279.04	391.38	608.62	87.66	34
27	311.21	428.51	571.49	82.70	33
28	343.35	465.61	534.39	77.73	32
29	375.46	502.69	497.31	72.76	31
30	956407.54	959539.75	1040460.25	996867.79	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	68

21	Log-us.	Hapſolog-us.	An.hapſolog-us.	Antilog-us	
30	956407.54	959539.75	1040460.25	996867.79	30
31	439.60	576.79	423.21	62.81	29
32	471.63	613.80	386.20	57.83	28
33	503.63	650.79	349.21	52.84	27
34	535.61	687.76	312.24	47.85	26
35	567.56	724.70	275.30	42.86	25
36	599.48	761.62	238.38	37.86	24
37	631.37	798.52	201.48	32.85	23
38	663.24	835.40	164.60	27.84	22
39	695.08	872.25	127.75	22.83	21
40	956726.89	959909.08	1040090.92	996817.81	20
41	758.68	945.88	054.12	12.79	19
42	790.44	959982.67	1040017.33	07.77	18
43	822.17	960019.43	1039980.57	996802.74	17
44	853.87	056.17	943.83	996797.71	16
45	885.55	092.89	907.11	92.67	15
46	917.21	129.58	870.42	87.63	14
47	948.83	166.25	833.75	82.58	13
48	956980.43	202.90	797.10	77.53	12
49	957012.00	239.53	760.47	72.47	11
50	957043.55	960276.13	1039723.87	996767.41	10
51	075.06	312.71	687.29	62.35	9
52	106.56	349.27	650.73	57.28	8
53	138.02	385.81	614.19	52.21	7
54	169.46	422.33	577.67	47.13	6
55	200.87	458.82	541.18	42.05	5
56	232.26	495.29	504.71	36.97	4
57	263.62	531.74	468.26	31.88	3
58	294.95	568.17	431.83	26.79	2
59	326.26	604.57	395.43	21.69	1
60	957357.54	960640.96	1039359.04	996716.59	0
	Antilog-us	Anthapſol.	Hapſolog-us	Log-us.	68

22	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	957357.54	960640.96	1039359.04	996716.59	60
1	388.80	677.32	322.68	11.48	59
2	420.03	713.66	286.34	06.37	58
3	451.23	749.97	250.03	996701.25	57
4	482.40	786.27	213.73	996696.14	56
5	513.56	822.54	177.46	91.01	55
6	544.68	858.80	141.20	85.88	54
7	575.78	895.03	104.97	80.75	53
8	606.85	931.24	068.76	75.62	52
9	637.90	960967.42	1039032.58	70.48	51
10	957668.92	961003.59	1038996.41	996665.33	50
11	699.91	039.73	960.27	60.18	49
12	730.88	075.86	924.14	55.03	48
13	761.83	111.96	888.04	49.87	47
14	792.75	148.04	851.96	44.71	46
15	823.64	184.09	815.91	39.54	45
16	854.50	220.13	779.87	34.37	44
17	885.35	256.15	743.85	29.20	43
18	916.16	292.14	707.86	24.02	42
19	946.95	328.12	671.88	18.84	41
20	957977.72	961364.07	1038635.93	996613.65	40
21	958008.45	400.00	600.00	08.46	39
22	039.17	435.91	564.09	996603.26	38
23	069.86	471.80	528.20	996598.06	37
24	100.52	507.66	492.34	92.85	36
25	131.16	543.51	456.49	87.64	35
26	161.77	579.34	420.66	82.43	34
27	192.36	615.14	384.80	77.21	33
28	222.92	650.93	349.07	71.99	32
29	253.45	686.69	313.31	66.77	31
30	958283.97	961722.43	1038277.57	996561.53	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	67

22	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	958283.97	961722.43	1038277.57	996561.53	30
31	314.45	758.15	241.85	561.30	29
32	344.91	793.85	206.15	51.06	28
33	375.35	829.53	170.47	45.82	27
34	405.76	865.19	134.81	40.57	26
35	436.15	900.83	099.17	35.32	25
36	466.51	936.45	063.55	30.06	24
37	496.85	961972.05	1038027.95	24.80	23
38	527.16	962007.62	1037992.38	19.53	22
39	557.45	043.18	956.82	14.26	21
40	958587.71	962078.72	1037921.28	996508.99	20
41	617.95	114.23	885.77	996503.71	19
42	648.16	149.73	850.27	996498.43	18
43	678.35	185.20	814.80	93.14	17
44	708.51	220.66	779.34	87.85	16
45	738.65	256.09	743.91	82.56	15
46	768.76	291.50	708.50	77.26	14
47	798.85	326.90	673.10	71.95	13
48	828.92	362.27	637.73	66.65	12
49	858.96	397.63	602.37	61.33	11
50	958888.97	962432.96	1037567.04	996456.02	10
51	918.97	468.27	531.73	50.69	9
52	948.93	503.56	496.44	45.37	8
53	958978.88	538.84	461.16	40.04	7
54	959008.80	574.09	425.91	34.70	6
55	038.69	609.32	390.68	29.37	5
56	068.56	644.54	355.46	24.02	4
57	098.41	679.73	320.27	18.68	3
58	128.23	714.91	285.09	13.32	2
59	158.03	750.06	249.94	07.97	1
60	959187.80	962785.19	1037214.81	996402.61	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	67

23	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	959187.80	962785.19	1037214.81	996402.61	60
1	217.55	820.31	179.69	396397.24	59
2	247.28	855.40	144.60	91.87	58
3	276.98	890.48	109.52	86.50	57
4	306.66	925.53	074.47	81.12	56
5	336.31	960.57	039.43	75.74	55
6	365.94	962995.58	1037004.42	70.36	54
7	395.55	963030.58	1036969.42	64.96	53
8	425.13	065.56	934.44	59.57	52
9	454.69	100.52	899.48	54.17	51
10	959484.22	963135.45	1036864.55	996348.77	50
11	513.73	170.37	829.63	43.36	49
12	543.22	205.27	794.73	37.95	48
13	572.68	240.15	759.85	32.53	47
14	602.12	275.01	724.99	27.11	46
15	631.54	309.85	690.15	21.68	45
16	660.93	344.68	655.32	16.25	44
17	690.30	379.48	620.52	10.82	43
18	719.65	414.26	585.74	996305.38	42
19	748.97	449.03	550.97	996299.94	41
20	959778.27	963483.78	1036516.22	996294.49	40
21	807.54	518.50	481.50	89.04	39
22	836.79	553.21	446.79	83.58	38
23	866.02	587.90	412.10	78.12	37
24	895.23	622.57	377.43	72.66	36
25	924.41	657.22	342.78	67.19	35
26	953.57	691.85	308.15	61.72	34
27	959982.70	726.46	273.54	56.24	33
28	960011.81	761.06	238.94	50.76	32
29	040.90	795.63	204.37	45.27	31
30	960069.97	963830.19	1036169.81	996239.78	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	66

2	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
30	,oc069.97	963830.19	1036169.81	996239.78	30
31	099.01	864.73	135.27	34.28	29
32	128.03	899.25	100.75	28.78	28
33	157.03	933.75	066.25	23.28	27
34	186.00	963968.23	1036031.77	17.77	26
35	214.95	964002.69	1035997.31	12.26	25
36	243.88	037.14	962.86	06.74	24
37	272.78	071.56	928.44	996201.22	23
38	301.66	105.97	894.03	996195.69	22
39	330.52	140.36	859.64	90.16	21
40	960359.36	964174.73	1035825.27	996184.63	20
41	388.17	209.08	790.92	79.09	19
42	416.96	243.42	756.58	73.55	18
43	445.73	277.73	722.27	68.00	17
44	474.48	312.03	687.97	62.45	16
45	503.20	346.31	653.69	56.89	15
46	531.90	380.57	619.43	51.33	14
47	560.57	414.81	585.19	45.76	13
48	589.23	449.03	550.97	40.20	12
49	617.86	483.24	516.76	34.62	11
50	960646.47	964517.43	1035482.57	996129.04	10
51	675.06	551.60	448.40	23.46	9
52	703.62	585.75	414.25	17.87	8
53	732.16	619.88	380.12	12.28	7
54	760.68	654.00	346.00	06.68	6
55	789.18	688.10	311.90	996101.08	5
56	817.65	722.17	277.83	996095.48	4
57	846.11	756.24	243.76	89.87	3
58	874.54	790.28	209.72	84.26	2
59	902.94	824.31	175.69	78.64	1
60	960931.33	964858.31	1035141.69	996073.02	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	66

24	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	960931.33	964858.31	1035141.69	996073.02	60
1	959.69	892.30	107.70	67.39	59
2	960988.03	926.28	073.72	61.76	58
3	961016.35	960.23	039.77	56.12	57
4	044.65	964994.17	1035005.83	50.48	56
5	072.93	965028.09	1034971.91	44.84	55
6	101.18	061.99	938.01	39.19	54
7	129.41	095.87	904.13	33.54	53
8	157.62	129.74	870.26	27.88	52
9	185.80	163.59	836.41	22.22	51
10	961213.97	965197.42	1034802.58	996016.55	50
11	242.11	231.23	768.77	10.88	49
12	270.23	265.03	734.97	996005.20	48
13	298.33	298.81	701.19	995999.52	47
14	326.41	332.57	667.43	93.84	46
15	354.46	366.31	633.69	88.15	45
16	382.50	400.04	599.96	82.46	44
17	410.51	433.75	566.25	76.76	43
18	438.50	467.44	532.56	71.06	42
19	466.47	501.12	498.88	65.35	41
20	961494.41	965534.77	1034465.23	995959.64	40
21	522.34	568.41	431.59	53.93	39
22	550.24	602.04	397.96	48.21	38
23	578.12	635.64	364.36	42.48	37
24	605.99	669.23	330.77	36.75	36
25	633.82	702.80	297.20	31.02	35
26	661.64	736.36	263.64	25.28	34
27	689.44	769.89	230.11	19.54	33
28	717.21	803.41	196.59	13.80	32
29	744.96	836.92	163.08	08.05	31
30	961772.70	965870.40	1034129.59	995902.29	30
	Antilog-us.	Anthapfol	Hapfolog-us	Log-us.	65

24	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us	
30	961772.70	965870.40	1034129.59	995902.29	30
31	800.41	903.87	096.13	995896.53	29
32	828.09	937.33	062.67	90.77	28
33	855.76	965970.76	1034029.24	85.00	27
34	883.41	966004.18	1033995.82	79.23	26
35	911.03	037.58	962.42	73.45	25
36	938.64	070.97	929.03	67.67	24
37	966.22	104.34	895.66	61.88	23
38	961993.78	137.69	861.31	56.09	22
39	962021.32	171.03	828.97	50.30	21
40	962048.84	966204.34	1033795.66	995844.50	20
41	076.34	237.65	762.35	38.69	19
42	103.82	270.93	729.07	32.88	18
43	131.27	304.20	695.80	27.07	17
44	158.71	337.45	662.55	21.25	16
45	186.12	370.69	629.31	15.43	15
46	213.51	403.91	596.09	09.61	14
47	240.88	437.11	562.89	995803.78	13
48	268.24	470.30	529.70	995797.94	12
49	295.57	503.46	496.54	92.10	11
50	962322.87	966536.62	1033463.38	995786.26	10
51	350.16	569.75	430.25	80.41	9
52	377.43	602.88	397.12	74.56	8
53	404.68	635.98	364.02	68.70	7
54	431.90	669.07	330.93	62.84	6
55	459.11	702.14	297.86	56.97	5
56	486.29	735.19	264.81	51.10	4
57	513.46	768.23	231.77	45.22	3
58	540.60	801.26	198.74	39.34	2
59	567.72	834.26	165.74	33.46	1
60	962594.83	966867.25	1033132.75	995727.57	0
	Antilog-us	Anthapsol	Hapsolog-u	Log-us.	65

25	Log-us.	Hapſ log-us.	Anthapſo-log-us.	Antilog-us	
0	962594.83	966867.25	1033132.75	995727.5	60
1	621.91	900.23	099.77	21.68	59
2	648.97	933.19	066.81	15.7	58
3	676.01	966.13	033.87	09.88	57
4	703.03	966999.06	1033000.94	995703.97	56
5	730.03	967031.97	1032968.03	995698.06	55
6	757.01	064.86	935.14	92.15	54
7	783.97	097.74	902.26	86.23	53
8	810.90	130.60	869.40	80.30	52
9	837.82	163.45	836.55	74.37	51
10	962864.72	967196.28	1032803.72	995668.44	50
11	891.60	229.10	770.90	62.50	49
12	918.45	261.90	738.10	56.56	48
13	945.29	294.68	705.32	50.61	47
14	972.11	327.45	672.55	44.66	46
15	962998.90	360.20	639.80	38.70	45
16	963025.68	392.94	607.06	32.74	44
17	052.43	425.66	574.34	26.78	43
18	079.17	458.36	541.64	20.81	42
19	105.89	491.05	508.95	14.83	41
20	963132.58	967523.72	1032476.28	995608.86	40
21	159.26	556.38	443.62	995602.87	39
22	185.91	589.03	410.97	995596.89	38
23	212.55	621.65	378.35	90.89	37
24	239.16	654.26	345.74	84.90	36
25	265.76	686.86	313.14	78.90	35
26	292.33	719.44	280.56	72.89	34
27	318.89	752.01	247.99	66.88	33
28	345.42	784.56	215.44	60.87	32
29	371.94	817.09	182.91	54.85	31
30	963398.44	967849.61	1032150.39	995548.82	30
	Antilog-us	Anthapſol.	Hapſolog-us	Log-us.	64

25	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	963398.44	967849.61	1032150.39	995548.82	30
31	424.91	882.11	117.89	42.80	29
32	451.37	914.60	085.40	36.76	28
33	477.80	947.08	052.92	30.73	27
34	504.22	967979.53	1032020.47	24.69	26
35	530.62	968011.98	1031988.02	18.64	25
36	556.99	044.40	955.60	12.59	24
37	583.35	076.82	923.18	06.53	23
38	609.69	109.21	890.79	995500.47	22
39	636.01	141.60	858.40	995494.41	21
40	963662.31	968173.96	1031826.04	995488.34	20
41	688.59	206.32	793.68	82.27	19
42	714.84	238.65	761.3	76.19	18
43	741.08	270.98	729.02	70.11	17
44	767.31	303.28	696.72	64.02	16
45	793.51	335.57	664.43	57.93	15
46	819.69	367.85	632.15	51.84	14
47	845.85	400.11	599.89	45.74	13
48	871.99	432.36	567.64	39.63	12
49	898.12	464.59	535.41	33.52	11
50	963924.22	968496.81	1031503.19	995427.41	10
51	950.30	529.01	470.99	21.29	9
52	963976.37	561.20	438.80	15.17	8
53	964002.41	593.38	406.62	09.04	7
54	028.44	625.53	374.47	995402.91	6
55	054.45	657.68	342.32	995396.77	5
56	080.44	689.81	310.19	90.63	4
57	106.40	721.92	278.08	84.48	3
58	132.35	754.02	245.98	78.33	2
59	158.28	786.11	213.89	72.18	1
60	964184.20	968818.18	1031181.82	995366.0	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	64

26	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us	
0	964184.20	968818.18	1031181.82	995366.02	60
1	210.09	850.23	149.77	59.85	59
2	235 96	882.27	117.73	53.69	58
3	261.82	914.30	085.70	47.51	57
4	287.65	946.31	053.69	41.34	56
5	313.47	968978.31	1031021.69	35.15	55
6	339.26	969010.30	1030989.70	28.97	54
7	365.04	042.26	957.74	22.78	53
8	390.80	074.22	925.78	16.58	52
9	416.54	106.16	893. 84	10.38	51
10	964442.26	969138.09	1030861.91	995304.18	50
11	467.96	170.00	830.00	995297.97	49
12	493.65	201.89	798.11	91.75	48
13	519.31	233.78	766.22	85.53	47
14	544.96	265.65	734.35	79.31	46
15	570.58	297.50	702.50	73.08	45
16	596.19	329.34	670.66	66.85	44
17	621.78	361.17	638.83	60.61	43
18	647.35	392.98	607.02	54.37	42
19	672.90	424.78	575.22	48.13	41
20	964698.44	969456.56	1030543.44	995241.88	40
21	723.95	488.33	511.67	35.62	39
22	749.45	520.09	479.91	29.36	38
23	774.92	551.83	448.17	23.10	37
24	800.38	583.55	416.45	16.83	36
25	825.82	615.27	384.73	10.55	35
26	851.24	646.97	353.03	995204.28	34
27	876.65	678.65	321.35	995197.99	33
28	902.03	710.32	289.68	91.71	32
29	927.40	741.98	258.02	85.41	31
30	964952.74	969773.63	1030226.37	995179.12	30
	Antilog-us	Anthapsol.	Hapsolog-us.	Log-us.	63

26	Log-us.	Hapfolo-g-us.	Anthapfo-log.us.	Antilog-us	
30	964952.74	969773.63	1030226.37	995179.12	30
31	964978.07	805.26	194.74	72.82	29
32	965003.38	836.87	163.13	66.51	28
33	028.68	868.47	131.53	60.20	27
34	053.95	900.06	099.94	53.89	26
35	079.20	931.64	068.36	47.57	25
36	104.44	963.20	036.80	41.24	24
37	129.66	969994.74	1030005.26	34.92	23
38	154.86	970026.28	1029973.72	28.58	22
39	180.04	057.80	942.20	22.24	21
40	965205.21	970089.30	1029910.70	995115.90	20
41	230.35	120.80	879.20	09.56	19
42	255.48	152.27	847.73	995103.20	18
43	280.59	183.74	816.26	995096.85	17
44	305.68	215.19	784.81	90.49	16
45	330.75	246.63	753.37	84.12	15
46	355.81	278.05	721.95	77.75	14
47	380.84	309.46	690.54	71.38	13
48	405.86	340.86	659.14	65.00	12
49	430.86	372.25	627.75	58.61	11
50	965455.84	970403.62	1029596.38	995052.23	10
51	480.81	434.97	565.03	45.83	9
52	505.75	466.32	533.68	39.44	8
53	530.68	497.65	502.35	33.03	7
54	555.59	528.97	471.03	26.63	6
55	580.48	560.27	439.73	20.22	5
56	605.36	591.56	408.44	13.80	4
57	630.21	622.84	377.16	07.38	3
58	655.05	654.10	345.90	995000.95	2
59	679.87	685.35	314.65	994994.52	1
60	965704.68	970716.59	1029283.41	994988.09	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	63

27	Log-us.	Hapfolo-g-us.	Anthaplo-log-us.	Antilog-us	
0	965704.68	970716.59	1029283.41	994988.09	60
1	729.46	747.81	252.19	81.65	59
2	754.23	779.02	220.98	75.21	58
3	778.98	810.22	189.78	68.76	57
4	803.71	841.41	158.59	62.30	56
5	828.42	872.58	127.42	55.85	55
6	853.12	903.74	096.26	49.38	54
7	877.80	934.88	065.12	42.92	53
8	902.46	966.01	033.99	36.45	52
9	927.10	970997.13	1029001.87	29.97	51
10	965951.73	971028.24	1028971.76	994923.49	50
11	965976.33	059.33	940.67	17.00	49
12	966000.93	090.41	909.59	10.51	48
13	025.50	121.48	878.52	994904.02	47
14	050.05	152.54	847.46	994897.52	46
15	074.59	183.58	816.42	91.01	45
16	099.11	214.61	785.39	84.50	44
17	123.61	245.62	754.38	77.99	43
18	148.10	276.62	723.38	71.47	42
19	172.57	307.61	692.39	64.95	41
20	966197.02	971338.59	1028661.41	994858.42	40
21	221.45	369.56	630.44	51.89	39
22	245.86	400.51	599.49	45.35	38
23	270.26	431.45	568.55	38.81	37
24	294.64	462.37	537.63	32.27	36
25	319.00	493.29	506.71	25.72	35
26	343.35	524.19	475.81	19.16	34
27	367.68	555.08	444.92	12.60	33
28	391.99	585.95	414.05	994806.04	32
29	416.28	616.82	383.18	994799.47	31
30	966440.56	971647.67	1028352.33	994791.89	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	62

27	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	966440.56	971647.67	1028352.33	994792.89	30
31	464.82	678.51	321.49	86.31	29
32	489.06	709.33	290.67	79.73	28
33	513.29	740.14	259.86	73.14	27
34	537.49	770.94	229.06	66.55	26
35	561.68	801.73	198.27	59.95	25
36	585.86	832.51	167.49	53.35	24
37	610.01	863.27	136.73	46.74	23
38	634.15	894.02	105.98	40.13	22
39	658.28	924.76	075.24	33.52	21
40	966682.38	971955.49	1028044.51	994726.89	20
41	706.47	971986.20	1028013.80	20.27	19
42	730.54	972016.90	1017983.10	13.64	18
43	754.59	047.59	952.41	07.00	17
44	778.63	078.27	921.73	994700.36	16
45	802.65	108.93	891.07	99:693.72	15
46	826.65	139.58	860.42	87.07	14
47	850.64	170.22	829.78	80.42	13
48	874.61	200.85	799.15	73.76	12
49	898.56	231.47	768.53	67.10	11
50	966922.50	972262.07	1027737.93	994660.13	10
51	946.42	292.66	707.34	53.76	9
52	970.32	323.24	676.76	47.08	8
53	966994.20	353.81	646.19	40.40	7
54	967018.07	384.36	615.64	33.71	6
55	041.92	414.90	585.10	27.02	4
56	065.76	445.43	554.57	20.32	5
57	089.58	475.95	524.05	13.62	3
58	113.38	506.46	493.54	06.92	2
59	137.16	536.95	463.05	00.21	1
60	967160.93	972567.44	1027432.56	994593.49	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	62

28	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us	
0	967160.93	972567.44	1027432.56	994593.49	60
1	184.68	597.91	402.09	86.77	59
2	208.41	628.37	371.63	80.05	58
3	232.13	658.81	341.19	73.32	57
4	255.83	689.25	310.75	66.59	56
5	279.52	719.67	280.33	59.85	55
6	303.19	750.08	249.92	53.10	54
7	326.84	780.48	219.52	46.36	53
8	350.47	810.87	189.13	39.60	52
9	374.09	841.24	158.76	32.85	51
10	967397.69	972871.61	1027128.39	994526.09	50
11	421.28	901.96	098.04	19.32	49
12	444.85	932.30	067.70	12.55	48
13	468.40	962.63	037.37	994505.77	47
14	491.94	972992.95	1027007.05	994498.99	46
15	515.46	973023.25	1026976.75	92.20	45
16	538.96	053.54	946.46	85.41	44
17	562.44	083.83	916.17	78.62	43
18	585.92	114.10	885.90	71.82	42
19	609.37	144.36	855.64	65.01	41
20	967632.81	973174.60	1026825.40	994458.21	40
21	656.23	204.84	795. 6	51.39	39
22	679.63	235.06	764.94	44.57	38
23	703.02	265.27	734.73	37.75	37
24	726.40	295.47	704.53	30.92	36
25	749.75	325.66	674.34	24.09	35
26	773.09	355.84	644.16	17.25	34
27	796.42	386.01	613.99	10.41	33
28	819.72	416.16	583.84	994403.56	32
29	843.01	446.31	553.69	994396.71	31
30	967866.29	973476.44	1026523.56	994389.85	30
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	61

28	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	967866.29	973476.44	1026523.56	994389.85	30
31	889.55	506.56	493.44	82.99	29
32	912.79	536.67	463.33	76.12	28
33	936.02	566.77	433.23	69.25	27
34	959.23	596.85	403.15	62.38	26
35	967982.43	626.93	373.07	55.49	25
36	968005.60	656.99	343.01	48.61	24
37	028.77	687.05	312.95	41.72	23
38	051.91	717.09	282.91	34.82	22
39	075.04	747.12	252.88	27.92	21
40	968098.16	973777.14	1026222.86	994321.02	20
41	121.26	807.15	192.85	14.11	19
42	144.34	837.14	162.86	07.20	18
43	167.41	867.13	132.87	994300.28	17
44	190.46	897.10	102.90	994293.35	16
45	213.49	927.07	072.93	86.43	15
46	236.51	957.02	042.98	79.49	14
47	259.52	973986.96	1026013.04	72.55	13
48	282.50	974016.89	1025983.11	65.61	12
49	305.48	046.81	953.19	58.66	11
50	968328.43	974076.72	1025933.28	994251.71	10
51	351.37	106.62	893.38	44.76	9
52	374.30	136.50	863.50	37.79	8
53	397.20	166.38	833.62	30.83	7
54	420.10	196.24	803.76	23.86	6
55	442.97	226.09	773.91	16.88	5
56	465.83	255.94	744.06	09.90	4
57	488.68	285.77	714.23	994202.91	3
58	511.51	315.59	684.41	994195.92	2
59	534.32	345.40	654.60	88.93	1
60	968557.12	974375.20	1025624.80	994181.93	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	61

29	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	968557.12	974375.20	1025614.80	994181.93	60
1	579.91	404.99	595.01	74.92	59
2	602.67	434.70	565.24	67.91	58
3	625.42	464.53	535.47	60.90	57
4	648.16	494.28	505.72	53.88	56
5	670.88	524.03	475.97	46.85	55
6	693.59	553.76	446.24	39.82	54
7	716.28	583.49	416.51	32.79	53
8	738.95	613.20	386.80	25.75	52
9	761.61	642.90	357.10	18.71	51
10	968784.25	974672.59	1025327.41	994111.66	50
11	806.88	702.27	297.73	994104.61	49
12	829.49	731.94	268.06	994097.55	48
13	852.09	761.60	238.40	90.48	47
14	874.67	791.25	208.75	83.42	46
15	897.23	820.89	179.11	76.34	45
16	919.78	850.52	149.48	69.27	44
17	942.32	880.13	119.87	62.19	43
18	964.84	909.74	090.26	55.10	42
19	968987.34	939.34	060.66	48.01	41
20	969009.83	974968.91	1025031.08	994040.91	40
21	032.31	974998.50	1025001.50	33.81	39
22	054.76	975028.06	1024971.94	26.70	38
23	077.21	057.62	942.38	19.59	37
24	099.64	087.16	912.84	12.48	36
25	122.05	116.69	883.31	994005.35	35
26	144.45	146.22	853.78	993998.23	34
27	166.83	175.73	824.27	91.10	33
28	189.19	205.23	794.77	83.96	32
29	211.55	234.72	765.28	76.82	31
30	969233.88	975264.20	1024735.80	993969.68	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	60

29	Log-us.	Haplolog-us.	Anthaplolog-us.	Antilog-us	
30	969233.88	975264.20	1024735.80	993969.68	30
31	256.40	293.68	706.32	62.53	29
32	278.51	323.14	676.86	55.37	28
33	300.80	352.59	647.41	48.21	27
34	323.08	382.03	617.97	41.05	26
35	345.34	411.46	588.54	33.88	25
36	367.58	440.88	559.12	26.71	24
37	389.81	470.29	529.71	19.53	23
38	412.03	499.69	500.31	12.34	22
39	434.23	529.08	470.92	993905.15	21
40	969456.42	975558.46	1024441.54	993897.96	20
41	478.59	587.83	412.17	90.76	19
42	500.74	617.18	382.81	83.56	18
43	522.88	646.53	353.47	76.35	17
44	545.01	675.87	324.13	69.14	16
45	567.12	705.20	294.80	61.92	15
46	589.22	734.52	265.48	54.70	14
47	611.30	763.83	236.17	47.47	13
48	633.36	793.13	206.87	40.24	12
49	655.41	822.42	177.58	33.00	11
50	9096 77.4	97585[illegible].70	1024148.30	993825.76	10
51	699.47	880.96	119.04	18.51	9
52	721.48	910.22	089.78	11.26	8
53	743.47	939.47	060.53	993804.00	7
54	765.45	968.71	031.29	993796.74	6
55	787.41	975997.94	1024002.06	89.47	5
56	809.36	976027.16	1023972.84	82.20	4
57	831.29	056.37	943.63	74.92	3
58	853.21	085.57	914.43	67.64	2
59	875.11	114.76	885.24	60.35	1
60	969897.00	976143.94	1023856.06	993753.06	0
	Antilog-us	Anthapsol.	Haplologus	Log-us.	60

30	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	969897.00	976143.94	1023856.06	993753.06	60
1	918.87	173.11	826.89	45.77	59
2	940.73	202.27	797.73	38.47	58
3	962.58	231.42	768.58	31.16	57
4	969984.41	260.56	739.44	23.85	56
5	970006.22	289.69	710.31	16.53	55
6	028.02	318.81	681.19	09.21	54
7	049.81	347.92	652.08	993701.89	53
8	071.58	377.02	622.98	993694.56	52
9	093.34	406.12	593.88	87.22	51
10	970115.08	970435.20	1023564.80	993679.88	50
11	136.81	464.27	535.73	72.54	49
12	158.52	493.34	506.66	65.19	48
13	180.22	522.39	477.61	57.83	47
14	201.90	551.43	448.57	50.47	46
15	223.57	580.47	419.53	43.11	45
16	245.23	609.49	390.51	35.74	44
17	266.87	638.51	361.49	28.36	43
18	288.49	667.51	332.49	20.98	42
19	310.11	696.51	303.49	13.60	41
20	970331.70	976725.50	1023274.50	993606.21	40
21	353.29	754.48	245.52	993598.81	39
22	374.86	783.44	216.56	91.41	38
23	396.41	812.40	187.60	84.01	37
24	417.95	841.35	158.65	76.60	36
25	439.47	870.29	129.71	69.18	35
26	460.99	899.22	100.78	61.77	34
27	482.48	928.14	071.86	54.34	33
28	503.97	957.05	042.95	46.91	32
29	525.43	976985.96	1023014.04	39.48	31
30	970540.89	977014.89	1022985.15	993532.04	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log us.	59

30	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	970546.89	977014.85	1022985.15	993532.04	30
31	568.33	043.73	956.27	24.59	29
32	589.75	072.61	927.39	17.15	28
33	611.16	101.47	898.53	09.69	27
34	632.56	130.33	869.67	993502.23	26
35	653.94	159.17	840.83	993494.77	25
36	675.31	188.01	811.99	87.30	24
37	696.67	216.84	783.16	79.83	23
38	718.01	245.66	754.34	72.35	22
39	739.33	274.47	725.53	64.86	21
40	970760.64	977303.27	1022696.73	993457.38	20
41	781.94	332.06	667.94	49.88	19
42	803.23	360.84	639.16	42.38	18
43	824.50	389.61	610.39	34.88	17
44	845.75	418.38	581.62	27.37	16
45	866.99	447.13	552.87	19.86	15
46	888.22	475.88	524.12	12.34	14
47	909.43	504.62	495.38	993404.81	13
48	930.63	533.34	466.66	993397.29	12
49	951.82	562.06	437.94	89.76	11
50	970972.99	977590.77	1022409.23	993382.22	10
51	970994.15	619.47	380.53	74.67	9
52	971015. 9	648.16	351.84	67.13	8
53	036.42	676.85	323.15	59.57	7
54	057.53	705.52	294.48	52.01	6
55	078.63	734.18	265.82	44.45	5
56	099.72	762.84	237.16	36.88	4
57	120.80	791.49	208 51	29.31	3
58	141.86	820.12	179.88	21.73	2
59	162.90	848.75	151.25	14.15	1
60	971183.93	977877.37	1022122.63	993306.56	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	59

31	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	971183.93	977877.37	1022122.63	993306.56	60
1	204.95	905.99	094.01	993298.97	59
2	225.96	934.59	065.41	91.37	58
3	249.95	963.18	036.82	83.76	57
4	267.92	977991.77	1022008.23	76.16	56
5	288.89	978020.34	1021979.66	68.54	55
6	309.83	048.91	951.09	60.92	54
7	330.77	077.47	922.53	53.30	53
8	351.69	106.02	893.98	45.67	52
9	372.60	134.56	865.44	38.04	51
10	971393.49	978163.09	1021836.91	993230.40	50
11	414.37	191.62	808.38	22.76	49
12	435.24	220.13	779.87	15.11	48
13	456.09	248.64	751.36	993207.46	47
14	476.93	277.13	722.87	993199.80	46
15	497.76	305.62	694.38	92.13	45
16	518.57	334.10	665.90	84.47	44
17	539.37	362.58	637.42	76.79	43
18	560.15	391.04	608.96	69.11	42
19	580.92	419.49	580.51	61.43	41
20	971601.68	978447.94	1021552.06	993153.74	40
21	622.43	476.38	523.62	46.05	39
22	643.16	504.81	495.19	38.35	38
23	663.87	533.23	466.77	30.65	37
24	684.58	561.64	438.36	22.94	36
25	705.26	590.04	409.96	15.22	35
26	725.94	618.44	381.56	993107.50	34
27	746.60	646.82	353.18	993099.78	33
28	767.25	675.20	324.80	92.05	32
29	787.89	703.57	296.43	84.32	31
30	971808.51	978731.93	1021268.07	993076.58	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	58

31	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	971808.51	978731.93	1021268.07	993076.58	30
31	829.12	760.28	239.71	68.83	29
32	849.71	788.63	211.37	61.09	28
33	870.30	816.96	183.04	53.33	27
34	890.86	845.29	154.71	45.57	26
35	911.42	873.61	126.39	37.81	25
36	931.96	901.92	098.08	30.04	24
37	952.49	930.23	069.77	22.26	23
38	973.00	958.52	041.48	14.48	22
39	971993.50	978986.81	1021013.19	993006.70	21
40	972013.99	979015.08	1020984.92	992998.91	20
41	034.47	043.35	956.65	91.12	19
42	054.93	071.61	928.39	83.32	18
43	075.38	099.87	900.13	75.51	17
44	095.81	128.11	871.89	67.70	16
45	116.23	156.35	843.65	59.89	15
46	136.64	184.58	815.42	52.07	14
47	157.04	212.80	787.20	44.24	13
48	177.42	241.01	758.99	36.41	12
49	197.79	269.21	730.79	28.57	11
50	972218.14	979297.41	1020702.59	992920.73	10
51	238.48	325.60	674.40	12.89	9
52	258.81	353.78	646.22	992905.04	8
53	279.13	381.95	618.05	992897.18	7
54	299.43	410.11	589.89	89.32	6
55	319.72	438.27	561.73	81.45	5
56	340.00	466.41	533.59	73.58	4
57	360.26	494.55	505.45	65.71	3
58	380.51	522.68	477.32	57.83	2
59	400.75	550.81	449.19	49.94	1
60	972420.97	979578.92	1020421.08	992841.05	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	58

82	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us.	
0	972420.97	979578.92	1020421.08	992842.05	60
1	441.18	607.03	392.97	34.15	59
2	461.38	635.13	364.87	26.25	58
3	481.56	663.22	336.78	18.34	57
4	501.74	691.30	308.70	10.43	56
5	521.89	719.38	280.62	992802.51	55
6	542.04	747.45	252.55	992794.59	54
7	562.17	775.51	224.49	86.66	53
8	582.29	803.56	196.44	78.73	52
9	602.40	831.60	168.40	70.79	51
10	972622.49	979859.64	1020140.36	992762.85	50
11	642.57	887.67	112.33	54.90	49
12	662.64	915.69	084.31	46.95	48
13	682.69	943.70	056.30	38.99	47
14	702.73	971.70	028.30	31.03	46
15	722.76	979999.70	1020000.30	23.06	45
16	742.78	980027.69	1019972.31	15.09	44
17	762.78	055.67	944.33	992707.11	43
18	781.77	083.65	916.35	992699.13	42
19	802.75	111.61	888.39	91.14	41
20	972822.71	980139.57	1019860.43	992683.14	40
21	842.67	167.52	832.48	75.14	39
22	862.60	195.46	804.54	67.14	38
23	882.53	223.40	776.60	59.13	37
24	902.44	251.33	748.67	51.12	36
25	922.34	279.25	720.75	43.10	35
26	942.23	307.16	692.84	35.07	34
27	962.10	335.06	664.94	27.04	33
28	972981.97	362.96	637.04	19.01	32
29	973001.82	390.85	609.15	10.96	31
30	973021.65	980418.73	1019581.27	992602.92	30
	Antilog-us.	Anthapsol.	Hapsolog-us	Log-us.	57

32	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	973021.65	980418.73	1019581.27	992602.92	30
31	041.48	446.61	553.39	992594.87	29
32	061.29	474.47	525.53	86.81	28
33	081.09	502.33	497.67	78.75	27
34	100.87	530.19	469.81	70.69	26
35	120.64	558.03	441.97	62.61	25
36	140.40	585.87	414.13	54.54	24
37	160.15	613.70	386.30	46.46	23
38	179.89	641.52	358.48	38.37	22
39	199.61	669.33	330.67	30.28	21
40	973219.32	980697.14	1019302.86	992522.18	20
41	239.02	724.94	275.06	14.08	19
42	258.70	752.73	247.27	992505.97	18
43	278.37	780.52	219.48	992497.86	17
44	298.03	808.29	191.71	89.74	16
45	317.68	836.06	163.94	81.61	15
46	337.31	863.83	136.17	73.49	14
47	356.93	891.58	108.42	65.35	13
48	376.54	919.33	080.67	57.21	12
49	396.14	947.07	052.93	49.07	11
50	973415.72	980974.80	1019025.20	992440.92	10
51	435.29	981002.53	1018997.47	32.77	9
52	454.85	030.25	969.75	24.61	8
53	474.40	057.96	942.04	16.44	7
54	493.93	085.66	914.34	08.27	6
55	513.45	113.36	886.64	992400.10	5
56	532.96	141.05	858.95	992391.91	4
57	552.46	168.73	831.27	83.73	3
58	571.95	196.41	803.59	75.54	2
59	591.42	224.08	775.92	67.34	1
60	973610.88	981251.74	1018748.26	992359.14	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	57

33	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
0	973610.88	981251.74	1018748.26	992359.14	60
1	630.32	279.39	720.61	50.93	59
2	649.76	307.04	692.96	42.72	8
3	669.18	334.68	665.32	34.50	57
4	688.59	362.31	637.69	26.28	56
5	707.99	389.93	610.07	18.05	55
6	727.37	417.55	582.45	09.82	54
7	746.75	445.16	554.84	992301.58	53
8	766.11	472.77	527.23	992293.34	52
9	785.46	500.36	499.64	85.09	51
10	973804.79	981527.95	1018472.05	992276.84	50
11	824.12	555.54	444.46	68.58	49
12	843.43	583.11	416.89	60.31	48
13	862.73	610.68	389.32	52.05	47
14	882.01	638.24	361.76	43.77	46
15	901.29	665.80	334.20	35.49	45
16	920.55	693.35	306.65	27.21	44
17	939.80	720.89	279.11	18.91	43
18	959.04	748.42	251.58	10.62	42
19	978.27	775.95	224.05	992202.32	41
20	973997.48	981803.47	1018196.53	992194.01	40
21	974016.68	830.98	169.02	85.70	39
22	035.87	858.49	141.51	77.38	38
23	055.05	885.99	114.01	69.06	37
24	074.21	913.48	086.52	60.73	36
25	093.37	940.96	059.04	52.40	35
26	112.51	968.44	031.56	44.06	34
27	131.64	981995.92	1018004.08	35.72	33
28	150.75	982023.38	1017976.62	27.37	32
29	169.86	050.84	949.16	19.02	31
30	974188.95	981078.29	1017921.71	992110.66	30
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	56

33	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us.	
30	974188.95	982078.29	1017921.71	992110.66	30
31	208.03	105.74	894.26	992102.29	29
32	227.10	133.17	866.83	992093.93	28
33	246.16	160.60	839.40	85.55	27
34	265.20	188.03	811.97	77.17	26
35	284.23	215.45	784.55	68.78	25
36	303.25	242.86	757.14	60.39	24
37	322.26	270.26	729.74	52.00	23
38	341.26	297.66	702.34	43.60	22
39	360. 24	325.05	674.95	35.19	21
40	974379.21	982352.44	1017647.56	992026.78	20
41	398.17	379.81	620.19	18.36	19
42	417.12	407.19	592.81	09.94	18
43	436.06	434.55	565.45	992001.51	17
44	454.98	461.91	538.09	991993.08	16
45	473.90	489.26	510.74	84.64	15
46	492.80	516.60	483.40	76.19	14
47	511.69	543.94	456.06	67.75	13
48	530.56	571.27	428.73	59.29	12
49	549.43	598.60	401.40	50.83	11
50	974568.28	982625.92	1017374.08	991942.37	10
51	587.12	653.23	346.77	33.90	9
52	605.95	680.53	319.47	25.42	8
53	624.77	707.83	292.17	16.94	7
54	643.58	735.13	264.87	991908.45	6
55	662.37	762.41	237.59	991899.96	5
56	681.15	789.69	210.31	91.46	4
57	699. 92	816.96	183.04	82.96	3
58	718. 68	844.23	155.77	74.45	2
59	737.43	871.49	128.51	65.94	1
60	974756.17	982898.74	1017101.26	991857.41	0
	Antilog-us.	Anthapsol.	Hapsolog-us	og-us.	56

34	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	974756.17	982898.74	1017101.26	991857.42	60
1	774.89	925.99	074.01	48.90	59
2	793.60	953.23	046.77	40.37	58
3	812.30	982980.47	1017019.53	31.83	57
4	830.99	983007.69	1016992.31	23.29	56
5	849.67	034.92	965.08	14.75	55
6	868.33	062.13	937.87	991806.20	54
7	886.98	089.34	910.66	991797.64	53
8	905.62	116.54	883.46	89.08	52
9	924.25	143.74	856.26	80.51	51
10	974942.87	983170.93	1016829.07	991771.94	50
11	961.48	198.11	801.89	63.36	49
12	980.07	225.29	774.71	54.78	48
13	974998.66	252.46	747.54	46.19	47
14	975017.23	279.63	720.37	37.60	46
15	035.79	306.79	693.21	29.00	45
16	054.34	333.94	666.06	20.40	44
17	072.87	361.09	638.91	11.79	43
18	091.40	388.23	611.77	991703.17	42
19	109.91	415.36	584.64	991694.55	41
20	975128.42	983442.49	1016557.51	991685.93	40
21	146.91	469.61	530.39	77.30	39
22	165.38	496.73	503.27	68.66	38
23	183.85	523.84	476.16	60.02	37
24	202.31	550.94	449.06	51.37	36
25	220.75	578.04	421.96	42.72	35
26	239.19	605.13	394.87	34.06	34
27	257.61	632.21	367.79	25.39	33
28	276.02	659.29	340.71	16.73	32
29	294.42	686.36	313.64	991608.05	31
30	975312.80	983713.43	1016286.57	991599.37	30
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	55

14	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
30	975312.80	983713.43	1016286.57	991599.37	30
31	331.18	740.49	259.51	90.69	29
32	349.54	767.55	232.45	82.00	28
33	367.90	794.60	205.40	73.30	27
34	386.24	821.64	178.36	64.60	26
35	404.57	848.67	151.33	55.89	25
36	422.88	875.71	124.29	47.18	24
37	441.19	902.73	097.27	38.46	23
38	459.49	929.75	070.25	29.74	22
39	477.77	956.76	043.24	21.01	21
40	975496.04	983983.77	1016016.23	991512.28	20
41	514.31	984010.77	1015989.23	991503.54	19
42	532.56	037.76	962.24	991494.79	18
43	550.80	064.75	935.25	86.04	17
44	569.02	091.74	908.26	77.29	16
45	587.24	118.71	881.29	68.52	15
46	605.44	145.69	854.31	59.76	14
47	623.64	172.65	827.35	50.99	13
48	641.82	199.61	800.39	42.21	12
49	659.99	226.57	773.43	33.42	11
50	975678.15	984253.51	1015746.49	991424.64	10
51	696.30	280.46	719.54	15.84	9
52	714.44	307.39	692.61	991407.04	8
53	732.56	334.32	665.68	991398.24	7
54	750.68	361.25	638.75	89.43	6
55	768.78	388.17	611.83	80.61	5
56	786.87	415.08	584.92	71.79	4
57	804.95	441.99	558.01	62.96	3
58	823.02	468.89	531.11	54.13	2
59	841.08	495.79	504.21	45.29	1
60	975859.13	984522.68	1015477.32	991336.45	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	15

35	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us.	
0	975859.13	984522.68	1015477.32	991336.45	60
1	877.17	549.56	450.44	27.60	59
2	895.19	576.44	423.56	18.75	58
3	913.21	603.32	396.68	09.89	57
4	931.23	630.18	369.82	991301.02	56
5	949.20	657.05	342.95	991292.15	55
6	967.18	683.90	316.10	83.28	54
7	975985.15	710.75	289.25	74.40	53
8	976003.11	737.60	262.40	65.51	52
9	021.06	764.44	235.56	56.62	51
10	976038.99	984791.27	1015208.73	991247.72	50
11	056.92	818.10	181.90	38.82	49
12	074.83	844.92	155.08	29.91	48
13	092.74	871.74	128.26	20.99	47
14	110.63	898.55	101.45	12.07	46
15	128.51	925.36	074.64	991203.15	45
16	146.38	952.16	047.84	991194.22	44
17	164.24	984978.96	1015021.04	85.28	43
18	182.08	985005.75	1014994.25	76.34	42
19	199.92	032.53	967.47	67.39	41
20	976217.75	985059.31	1014940.69	991158.44	40
21	235.56	086.08	913.92	49.48	39
22	253.37	112.85	887.15	40.51	38
23	271.16	139.61	860.39	31.55	37
24	288.94	166.37	833.63	22.57	36
25	306.71	193.12	806.88	13.59	35
26	324.47	219.87	780.13	991104.60	34
27	342.22	246.61	753.39	991095.61	33
28	359.96	273.35	726.65	86.61	32
29	377.69	300.08	699.92	77.61	31
30	976395.40	985326.80	1014673.20	991068.60	30
	Antilog-us.	Anthapsol.	Hapsolog-us	Log-us.	54

35	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	976395.40	985326.80	1014673.20	991068.60	30
31	413.11	353.52	646.48	59.59	29
32	430.80	380.23	619.77	50.57	28
33	448.49	406.94	593.06	41.55	27
34	466.16	433.65	566.35	32.51	26
35	483.82	460.34	539.66	23.48	25
36	501.47	487.04	512.96	14.44	24
37	519.11	513.72	486.28	991005.39	23
38	536.74	540.41	459.59	990996.34	22
39	554.36	567.08	432.92	87.28	21
40	976571.97	985593.76	1014406.24	990978.21	20
41	589.57	620.42	379.58	69.15	19
42	607.15	647.08	352.92	60.07	18
43	624.73	673.74	326.26	50.99	17
44	642.29	700.39	299.61	41.90	16
45	659.85	727.04	272.96	32.81	15
46	677.39	753.68	246.32	23.71	14
47	694.92	780.31	219.69	14.61	13
48	712.44	806.94	193.06	990905.50	12
49	729.96	833.57	166.43	990896.39	11
50	976747.46	985860.19	1014139.81	990887.27	10
51	764.94	886.80	113.20	78.14	9
52	782.42	913.41	086.59	69.01	8
53	799.89	940.02	059.98	59.88	7
54	817.35	966.61	033.39	50.73	6
55	834.80	985993.21	1014006.79	41.59	5
56	852.23	986019.80	1013980.20	32.43	4
57	869.66	046.38	953.62	23.27	3
58	887.07	072.96	927.04	14.11	2
59	904.48	099.54	900.46	990804.94	1
60	976921.87	986126.10	1013873.90	990795.76	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	54

36'	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	976921.87	986126.10	1013873.90	990795.76	60
1	939.25	152.67	847.33	86.58	59
2	956.62	179.23	820.77	77.40	58
3	973.98	205.78	794.22	68.20	57
4	976991.34	232.33	767.67	59.01	56
5	977008.68	258.87	741.13	49.80	55
6	026.01	285.41	714.59	40.59	54
7	043.32	311.95	688.05	31.38	53
8	060.63	338.48	661.52	22.16	52
9	077.93	365.00	635.00	12.93	51
10	977095.22	986391.52	1013608.48	990703.70	50
11	112.49	418.03	581.97	990694.46	49
12	129.76	444.54	555.46	85.22	48
13	147.02	471.05	528.95	75.97	47
14	164.26	497.55	502.45	66.71	46
15	181.50	524.04	475.96	57.45	45
16	198.72	550.53	449.47	48.19	44
17	215.93	577.02	422.98	38.92	43
18	233.14	603.50	396.50	29.64	42
19	250.33	629.97	370.03	20.36	41
20	977267.51	986656.44	1013343.56	990611.07	40
21	284.68	682.91	317.09	990601.77	39
22	301.85	709.37	290.63	990592.47	38
23	319.00	735.83	264.17	83.17	37
24	336.14	762.28	237.72	73.86	36
25	353.27	788.73	211.27	64.54	35
26	370.39	815.17	184.83	55.22	34
27	387.49	841.60	158.40	45.89	33
28	404.59	868.04	131.96	36.56	32
29	421.68	894.46	105.54	27.22	31
30	977438.76	986920.89	1013079.11	990517.87	30
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	53

36	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	977438.76	986920.89	1013079.11	990517.87	30
31	455.83	947.31	052.69	990508.52	29
32	472.88	986973.72	1013026.28	990499.16	28
33	489.93	987000.13	1012999.87	89.80	27
34	506.97	026.53	973.47	80.43	26
35	523.99	052.93	947.07	71.06	25
36	541.01	079.33	920.67	61.68	24
37	558.01	105.72	894.28	52.30	23
38	575.01	132.10	867.90	42.91	22
39	591.99	158.48	841.52	33.51	21
40	977608.97	987184.86	1012815.14	990424.11	20
41	625.93	211.23	788.77	14.70	19
42	642.89	237.60	762.40	990405.29	18
43	659.83	263.96	736.04	990395.87	17
44	676.76	290.32	709.68	86.44	16
45	693.69	316.68	683.32	77.01	15
46	710.60	343.02	656.98	67.57	14
47	727.50	369.37	630.63	58.13	13
48	744.39	395.71	604.29	48.68	12
49	761.28	422.04	577.96	39.23	11
50	977778.15	987448.38	1012551.62	990329.77	10
51	795.01	474.70	525.30	20.31	9
52	811.86	501.02	498.98	10.84	8
53	828.70	527.34	472.66	990301.36	7
54	845.53	553.65	446.35	990291.88	6
55	862.35	579.96	420.04	82.39	5
56	879.16	606.27	393.73	72.89	4
57	895.96	632.57	367.43	63.39	3
58	912.75	658.86	341.14	53.89	2
59	929.53	685.15	314.85	44.38	1
60	977946.39	987711.44	1012288.56	990234.86	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	53

37	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	977946.30	987711.44	1012288.56	990234.86	60
1	963.06	737.72	262.28	25.34	59
2	979.81	764.00	236.00	15.81	58
3	977996.55	790.27	209.73	990206.28	57
4	978013.28	816.54	183.46	990196.74	56
5	030.00	842.81	157.19	87.19	55
6	046.71	869.07	130.93	77.64	54
7	063.41	895.33	104.67	68.08	53
8	080.10	921.58	078.42	58.52	52
9	096.77	947.82	052.18	48.95	51
10	978113.44	987974.07	1012025.93	990139.38	50
11	130.10	988000.31	1011999.69	29.80	49
12	146.75	026.54	973.46	20.2	48
13	163.39	052.77	947.23	10.6	47
14	180.02	079.00	921.00	990101.0	46
15	196.64	105.22	894.78	990091.42	45
16	213.24	131.44	868.56	81.81	44
17	229.84	157.65	842.35	72.19	43
18	246.43	183.86	816.14	62.57	42
19	263.01	210.07	789.93	52.94	41
20	978279.58	988236.27	1011763.73	990043.31	40
21	296.14	262.46	737.54	33.67	39
22	312.68	288.66	711.34	24.03	38
23	329.22	314.84	685.16	14.38	37
24	345.75	341.03	658.97	990004.72	36
25	362.27	367.21	632.79	989995.06	35
26	378.78	393.38	606.62	85.39	34
27	395.28	419.56	580.44	75.72	33
28	411.77	445.72	554.28	66.04	32
29	428.24	471.89	528.11	56.36	31
30	978444.71	988498.05	1011501.95	989946.67	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	52

37	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
30	978444.71	988498.05	1011501.95	989946.67	30
31	461.17	524.20	475.80	36.97	29
32	477.62	550.35	449.65	27.27	28
33	494.06	576.50	423.50	17.56	27
34	510.49	601.64	397.36	989907.84	26
35	526.91	628.78	371.22	989898.12	25
36	543.32	654.92	345.08	88.40	24
37	559.72	681.05	318.95	78.67	23
38	576.11	707.18	292.82	68.93	22
39	592.49	733.30	266.70	59.19	21
40	978608.86	988759.42	1011240.58	989849.44	20
41	625.22	785.54	214.46	39.68	19
42	641.57	811.65	188.35	29.92	18
43	657.91	837.75	162.25	20.15	17
44	674.24	863.86	136.14	10.38	16
45	690.56	889.96	110.04	989800.60	15
46	706.87	916.05	083.95	989790.82	14
47	723.17	942.14	057.86	81.03	13
48	739.46	968.23	031.77	71.23	12
49	755.74	988994.32	1011005.68	61.43	11
50	978772.02	989020.40	1010979.60	989751.62	10
51	788.28	046.47	953.53	41.81	9
52	804.53	072.54	927.46	31.99	8
53	820.77	098.61	901.39	22.16	7
54	837.01	124.68	875.32	12.33	6
55	853.23	150.74	849.26	989702.49	5
56	869.44	176.79	823.21	989692.65	4
57	885.65	202.85	797.15	82.80	3
58	901.84	228.90	771.10	72.94	2
59	918.02	254.94	745.06	63.08	1
60	978934.20	989280.98	1010719.02	989653.21	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	52

38	Log-us.	Hapsolo-g-us.	Anthapso-log-us.	Antilog-us	
0	978934.20	989280.98	1010719.02	989653.21	60
1	950.36	307.02	692.98	43.34	59
2	966.52	333.06	666.94	33.46	58
3	982.66	359.09	640.91	23.58	57
4	978998.80	385.11	614.89	13.69	56
5	979014.93	411.14	588.86	989603.79	55
6	031.04	437.15	562.85	989593.89	54
7	047.15	463.17	536.83	83.98	53
8	063.25	489.18	510.82	74.06	52
9	079.33	515.19	484.81	64.14	51
10	979095.41	989541.19	1010458.81	989554.22	50
11	111.48	567.19	432.81	44.28	49
12	127.54	593.19	406.81	34.35	48
13	143.59	619.18	380.82	24.40	47
14	159.63	645.17	354.83	14.45	46
15	175.66	671.16	328.84	989504.50	45
16	191.68	697.14	302.86	989494.53	44
17	207.69	723.12	276.88	84.57	43
18	223.69	749.10	250.90	74.59	42
19	239.68	775.07	224.93	64.61	41
20	979255.66	989801.04	1010198.96	989454.63	40
21	271.63	827.00	173.00	44.63	39
22	287.60	852.96	147.04	34.64	38
23	303.55	878.92	121.08	24.63	37
24	319.49	904.87	095.13	14.62	36
25	335.43	930.82	069.18	989404.61	35
26	351.35	956.77	043.23	989394.58	34
27	367.27	989982.71	1010017.29	84.56	33
28	383.17	990008.65	1009991.35	74.52	32
29	399.07	034.59	965.41	64.48	31
30	979414.96	990060.52	1009939.48	989354.44	30
	Antilog-us	Anthapsol.	Hapsolog-us.	Log-us.	51

38	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us.	
30	979414.96	990060.52	1009939.48	989354.44	30
31	430.83	086.45	913.55	44.39	29
32	446.70	112.37	887.63	34.33	28
33	462.56	138.30	861.70	24.26	27
34	478.41	164.22	835.78	14.19	26
35	494.25	190.13	809.87	989304.12	25
36	510.08	216.04	783.96	989294.04	24
37	525.90	241.95	758.05	83.95	23
38	541.71	267.86	732.14	73.85	22
39	557.51	293.76	706.24	63.75	21
40	979573.30	990319.66	1009680.34	989253.65	20
41	589.09	345.55	654.45	43.54	19
42	604.86	371.44	628.56	33.42	18
43	620.62	397.33	602.67	23.29	17
44	636.38	423.21	576.79	13.16	16
45	652.12	449.10	550.90	989203.03	15
46	667.86	474.97	525.03	989192.89	14
47	683.59	500.85	499.15	82.74	13
48	699.30	526.72	473.28	72.58	12
49	715.01	552.59	447.41	62.42	11
50	979730.71	990578.45	1009421.55	989152.26	10
51	746.40	604.31	395.69	42.08	9
52	762.08	630.17	369.83	31.91	8
53	777.75	656.03	343.97	21.72	7
54	793.41	681.88	318.12	11.53	6
55	809.0	707.73	291.27	989101.33	5
56	824.70	733.57	266.43	989091.13	4
57	840.34	759.41	240.59	80.92	3
58	855.96	785.25	214.75	70.71	2
59	871.58	811.09	188.91	60.49	1
60	979887.18	990836.92	1009163.08	989050.26	0
	Antilog-us	Anthapsol.	Hapsolog-us	Log-us.	51

39	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us	
0	979887.18	990836.92	1009163.08	989050.26	60
1	902.78	862.75	137.25	40.03	59
2	918.36	888.58	111.42	29.79	58
3	933.94	914.40	085.60	19.54	57
4	949.51	940.22	059.78	9890 09.29	56
5	965.07	966.03	033.97	988999.03	55
6	980.62	990991.85	1009008.15	88.77	54
7	979996.16	991017.66	1008982.34	78.50	53
8	980011.69	043.47	956.53	68.22	52
9	027.21	069.27	930.73	57.94	51
10	980042.72	991095.07	1008904.93	988947.65	50
11	058.23	120.87	879.13	37.36	49
12	073.72	146.66	853.34	27.06	48
13	089.21	172.45	827.55	16.75	47
14	104.68	198.24	801.76	988906.44	46
15	120.15	224.03	775.97	988896.12	45
16	135.61	249.81	750.19	85.80	44
17	151.06	275.59	724.41	75.47	43
18	166.49	301.37	698.63	65.13	42
19	181.91	327.14	672.86	54.79	41
20	980197.35	991352.91	1008647.09	988844.44	40
21	212.76	378.68	621.32	34.08	39
22	228.16	404.44	595.56	23.72	38
23	243.55	430.20	569.80	13.35	37
24	258.94	455.96	544.04	988802.98	36
25	274.31	481.71	518.29	988792.60	35
26	289.68	507.47	492.53	82.21	34
27	305.04	533.22	466.78	71.82	33
28	320.38	558.96	441.04	61.42	32
29	335.72	584.71	415.29	51.02	31
30	980351.05	991610.45	1008389.55	988740.61	30
	Antilog-us	Anthapsol.	Hapsolog-us.	Log-us.	50

39	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
30	980351.05	991610.45	1008389.55	988740.61	30
31	366.37	636.18	363.82	30.19	29
32	381.68	661.92	338.08	19.77	28
33	396.99	687.65	312.35	988709.34	27
34	412.28	713.38	286.62	988698.90	26
35	427.57	739.11	260.89	88.46	25
36	442.84	764.83	235.17	78.01	24
37	458.11	790.55	209.45	67.56	23
38	473.36	816.27	183.73	57.10	22
39	488.61	841.98	158.02	46.63	21
40	980503.85	991867.69	1008132.31	988636.16	20
41	519.08	893.40	106.60	25.68	19
42	534.30	919.11	080.89	15.19	18
43	549.51	944.81	055.19	988604.70	17
44	564.72	970.51	029.49	988594.20	16
45	579.91	991996.21	1008003.79	83.70	15
46	595.10	992021.91	1007978.09	73.19	14
47	610.27	047.60	952.40	62.67	13
48	625.44	073.29	926.71	52.15	12
49	640.60	098.98	901.02	41.62	11
50	980655.75	992124.66	1007875.34	988531.09	10
51	670.89	150.34	849.66	20.55	9
52	686.02	176.02	823.98	988510.00	8
53	701.14	201.70	798.30	988499.45	7
54	716.26	227.37	772.63	88.89	6
55	731.36	253.04	746.96	78.31	5
56	746.46	278.71	721.29	67.75	4
57	761.54	304.37	695.63	57.17	3
58	776.62	330.04	669.96	46.59	2
59	791.69	355.70	644.30	35.99	1
60	980806.75	992381.35	1007618.65	988425.40	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	50

40	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
0	980806.75	992381.35	1007618.65	988425.40	60
1	821.80	407.01	592.99	14.79	59
2	836.84	432.66	567.34	988404.18	58
3	851.88	458.31	541.69	988393.57	57
4	866.90	483.96	516.04	82.94	56
5	881.92	509.60	490.40	72.32	55
6	896.92	535.24	464.76	61.68	54
7	911.92	560.88	439.12	51.04	53
8	926.91	586.52	413.48	40.39	52
9	941.89	612.15	387.85	29.74	51
10	980956.86	992637.78	1007362.22	988319.08	50
11	971.82	663.41	336.59	988308.41	49
12	980986.78	689.04	310.96	988297.74	48
13	981001.72	714.66	285.34	87.06	47
14	016.66	740.28	259.72	76.38	46
15	031.59	765.90	234.10	65.68	45
16	046.50	791.52	208.48	54.99	44
17	061.41	817.13	182.87	44.28	43
18	076.31	842.74	157.26	33.57	42
19	091.21	868.35	131.65	22.85	41
20	981106.09	992893.96	1007106.04	988212.13	40
21	120.96	919.56	080.44	988201.40	39
22	135.83	945.16	054.84	988190.67	38
23	150.69	970.76	029.24	79.92	37
24	165.54	992996.36	1007003.64	69.18	36
25	180.38	993021.95	1006978.05	58.42	35
26	195.21	047.55	952.45	47.66	34
27	210.03	073.14	926.86	36.89	33
28	224.84	098.72	901.28	26.12	32
29	239.65	124.31	875.69	15.34	31
30	981254.44	993149.89	1006850.11	988104.55	30
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	49

40	Log-us.	Hapsolog-us.	Anthapsolog-us.	Antilog-us.	
30	981254.44	993149.89	1006850.11	988104.55	30
31	269.23	175.47	824.53	093.76	29
32	284.01	201.05	798.95	082.96	28
33	298.78	226.62	773.38	072.15	27
34	313.54	252.20	747.80	061.34	26
35	328.29	277.77	722.23	050.52	25
36	343.03	303.34	696.66	039.70	24
37	357.77	328.90	671.10	028.87	23
38	372.50	354.46	645.54	018.03	22
39	387.21	380.03	619.97	988007.19	21
40	981401.92	993405.59	1006594.41	987996.34	20
41	416.62	431.14	568.86	985.48	19
42	431.31	456.70	543.30	974.62	18
43	446.00	482.25	517.75	963.75	17
44	460.67	507.80	492.20	952.87	16
45	475.34	533.35	466.65	941.99	15
46	489.99	558.89	441.11	931.10	14
47	504.64	584.44	415.56	920.21	13
48	519.28	609.98	390.02	909.30	12
49	533.91	635.52	364.48	898.40	11
50	981548.54	993661.05	1006338.95	987887.48	10
51	563.15	686.59	313.41	876.56	9
52	577.76	712.12	287.88	865.63	8
53	592.35	737.65	262.35	854.70	7
54	606.94	763.18	236.82	843.76	6
55	621.52	788.71	211.29	832.81	5
56	636.09	814.23	185.77	821.86	4
57	650.66	839.75	160.25	810.90	3
58	665.21	865.27	134.73	799.94	2
59	679.75	890.79	109.21	788.96	1
60	981694.29	993916.31	1006083.69	987777.99	0
	Antilog-us.	Anthapsol.	Hapsolog-us	Log-us.	49

41	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	981694.29	993916.31	1006083.69	987777.99	60
1	708.82	941.82	058.18	767.00	59
2	723.34	967.33	032.67	756.01	58
3	737.85	993992.84	1006007.16	745.01	57
4	752.35	994018.35	1005981.65	734.01	56
5	766.85	043.85	956.15	723.00	55
6	781.33	069.36	930.64	711.98	54
7	795.81	094.86	905.14	700.96	53
8	810.28	120.36	879.64	689.93	52
9	824.74	145.85	854.15	678.89	51
10	981839.19	994171.35	1005828.65	987667.85	50
11	853.64	196.84	803.16	656.80	49
12	868.07	222.33	777.67	645.74	48
13	882.50	247.82	752.18	634.68	47
14	896.92	273.31	726.69	623.61	46
15	911.33	298.79	701.21	612.53	45
16	925.73	324.28	675.72	601.45	44
17	940.12	349.76	650.24	590.36	43
18	954.50	375.24	624.76	579.27	42
19	968.88	400.72	599.28	568.16	41
20	981983.25	994426.19	1005573.81	987557.06	40
21	981997.61	451.66	548.34	545.94	39
22	982011.96	477.14	522.86	534.82	38
23	026.30	502.61	497.39	523.69	37
24	040.63	528.07	471.93	512.56	36
25	054.96	553.54	446.46	501.42	35
26	069.27	579.00	421.00	490.27	34
27	083.58	604.47	395.53	479.12	33
28	097.88	629.93	370.07	467.95	32
29	112.17	655.39	344.61	456.79	31
30	982126.46	994680.84	1005319.16	987445.61	30
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	48

41	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
30	982126.46	994680.84	1005319.16	987445.61	30
31	140.73	706.30	293.70	434.43	29
32	155.00	731.75	268.25	423.25	28
33	169.26	757.20	242.80	412.05	27
34	183.51	782.65	217.35	400.85	26
35	197.75	808.10	191.90	389.65	25
36	211.98	833.55	166.45	378.44	24
37	226.21	858.99	141.01	367.22	23
38	240.42	884.43	115.57	355.99	22
39	254.63	909.87	090.13	344.76	21
40	982268.83	994935.31	1005064.69	987333.52	20
41	283.02	960.75	039.25	322.27	19
42	297.21	994986.19	1005013.81	311.02	18
43	311.38	995011.62	1004988.38	299.76	17
44	325.55	037.05	962.95	288.49	16
45	339.71	062.48	937.52	277.22	15
46	353.86	087.91	912.09	265.94	14
47	368.00	113.34	886.66	254.66	13
48	382.13	138.76	861.24	243.37	12
49	396.26	164.19	835.81	232.07	11
50	982410.37	995189.61	1004810.39	987220.76	10
51	424.48	215.03	784.97	209.45	9
52	438.58	240.45	759.55	198.13	8
53	452.67	265.87	734.13	186.81	7
54	466.76	291.28	708.72	175.48	6
55	480.83	316.70	683.30	164.14	5
56	494.90	342.11	657.89	152.79	4
57	508.96	367.52	632.48	141.44	3
58	523.01	392.93	607.07	130.08	2
59	537.05	418.34	581.66	118.72	1
60	982551.09	995443.74	1004556.26	987107.35	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	48

42	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us.	
0	982551.09	995443.74	1004556.26	987107.35	60
1	565.12	469.15	530.85	095.97	59
2	579.13	494.55	505.45	084.58	58
3	593.14	519.95	480.05	073.19	57
4	607.15	545.35	454.65	061.79	56
5	621.14	570.75	429.25	050.39	55
6	635.12	596.15	403.85	038.98	54
7	649.10	621.54	378.46	027.56	53
8	663.07	646.94	353.06	016.13	52
9	677.03	672.33	327.67	987004.70	51
10	982690.98	995697.72	1004302.28	986993.26	50
11	704.93	723.11	276.89	981.82	49
12	718.87	748.50	251.50	970.37	48
13	732.79	773.89	226.11	958.91	47
14	746.71	799.27	200.73	947.44	46
15	760.63	824.65	175.35	935.97	45
16	774.53	850.04	149.96	924.49	44
17	788.43	875.42	124.58	913.01	43
18	802.31	900.80	099.20	901.52	42
19	816.19	926.18	073.82	890.02	41
20	982830.06	995951.55	1004048.45	986878.51	40
21	843.93	995976.93	1004023.07	867.00	39
22	857.78	996002.30	1003997.70	855.48	38
23	871.63	027.67	972.33	843.96	37
24	885.47	053.05	946.95	832.42	36
25	899.30	078.42	921.58	820.88	35
26	913.12	103.78	896.22	809.34	34
27	926.94	129.15	870.85	797.79	33
28	940.75	154.52	845.48	786.23	32
29	954.54	179.88	820.12	774.66	31
30	982968.33	996205.25	1003794.75	986763.09	30
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	47

42	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us.	
30	982968.33	996205.25	1003794.75	986763.09	30
31	982.12	230.61	769.39	751.51	29
32	982995.89	255.97	744.03	739.92	28
33	983009.66	281.33	718.67	728.33	27
34	023.42	306.69	693.31	716.73	26
35	037.17	332.04	667.96	705.12	25
36	050.91	357.40	642.60	693.51	24
37	064.64	382.75	617.25	681.89	23
38	078.37	408.11	591.89	670.26	22
39	092.09	433.46	566.54	658.63	21
40	983105.80	996458.81	1003541.19	986646.99	20
41	119.50	484.16	515.84	635.34	19
42	133.20	509.51	490.49	623.69	18
43	146.88	534.86	465.14	612.03	17
44	160.56	560.20	439.80	600.36	16
45	174.23	585.55	414.45	588.68	15
46	187.89	610.89	389.11	577.00	14
47	201.55	636.23	363.77	565.31	13
48	215.19	661.57	338.43	553.62	12
49	228.83	686.92	313.08	541.92	11
50	983242.46	996712.25	1003287.75	986530.21	10
51	256.09	737.59	262.41	518.49	9
52	269.70	762.93	237.07	506.77	8
53	283.31	788.27	211.73	495.04	7
54	296.91	813.60	186.40	483.31	6
55	310.50	838.93	161.07	471.56	5
56	324.08	864.27	135.73	459.81	4
57	337.66	889.60	110.40	448.06	3
58	351.22	914.93	085.07	436.29	2
59	364.78	940.26	059.74	424.52	1
60	983378.33	996965.59	1003034.41	986412.75	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	47

43	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us	
0	983378.33	996965.59	1003034.41	986412.75	60
1	391.88	996990.91	1003009.09	400.96	59
2	405.41	997016.24	1002983.76	389.17	58
3	418.94	041.57	958.43	377.37	57
4	432.46	066.89	933.11	365.57	56
5	445.97	092.21	907.79	353.76	55
6	459.48	117.54	882.46	341.94	54
7	472.97	142.86	857.14	330.11	53
8	486.46	168.18	831.82	318.28	52
9	499.94	193.50	806.50	306.44	51
10	983513.41	997218.82	1002781.18	986294.60	50
11	526.88	244.13	755.87	282.74	49
12	540.33	269.45	730.55	270.88	48
13	553.78	294.77	703.23	259.02	47
14	567.22	320.08	679.92	247.14	46
15	580.66	345.39	654.61	235.26	45
16	594.08	370.71	629.29	223.38	44
17	607.50	396.02	603.98	211.48	43
18	620.91	421.33	578.67	199.58	42
19	634.31	446.64	553.36	187.67	41
20	983647.71	997471.95	1002528.05	986175.76	40
21	661.09	497.26	502.74	163.83	39
22	674.47	522.57	477.43	151.90	38
23	687.84	547.87	452.13	139.97	37
24	701.21	573.18	426.82	128.03	36
25	714.56	598.49	401.51	116.08	35
26	727.91	623.79	376.21	104.12	34
27	741.25	649.09	350.91	092.15	33
28	754.58	674.40	325.60	080.18	32
29	767.90	699.70	300.30	068.21	31
30	983781.22	997725.00	1002275.00	986056.22	30
	Antilog-us	Anthapfol.	Hapfolog-us.	Log-us.	46

43	Log-us.	Hapfolog-us.	Anthapfolog-us.	Antilog-us	
30	983781.22	997725.00	1002275.00	986056.22	30
31	794.53	750.30	249.70	044.23	29
32	807.83	775.60	224.40	032.23	28
33	821.12	800.90	199.10	020.22	27
34	834.41	826.20	173.80	986008.21	26
35	847.69	851.49	148.51	985996.19	25
36	860.96	876.79	123.21	984.16	24
37	874.22	902.09	097.91	972.13	23
38	887.47	927.38	072.62	960.09	22
39	900.72	952.68	047.32	948.04	21
40	983913.96	997977.97	1002022.03	985935.99	20
41	927.19	998003.26	1001996.74	923.93	19
42	940.41	028.56	971.44	911.86	18
43	953.63	053.85	946.15	899.78	17
44	966.84	079.14	920.86	887.70	16
45	980.04	104.43	895.57	875.61	15
46	983993.23	129.72	870.28	863.51	14
47	984006.42	155.01	844.99	851.41	13
48	019.59	180.30	819.70	839.29	12
49	032.76	205.59	794.41	827.18	11
50	984045.93	998230.87	1001769.13	985815.05	10
51	059.08	256.16	743.84	802.92	9
52	072.23	281.45	718.55	790.78	8
53	085.37	306.73	693.27	778.63	7
54	098.50	332.02	667.98	766.48	6
55	111.62	357.30	642.70	754.32	5
56	124.74	382.59	617.41	742.15	4
57	137.85	407.87	592.13	729.98	3
58	150.95	433.15	566.85	717.79	2
59	164.04	458.44	541.56	705.61	1
60	984177.13	998483.72	1001516.28	985693.41	0
	Antilog-us	Anthapfol.	Hapfolog-us	Log-us.	46

44	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
0	984177.13	998483.72	1001516.28	985693.41	60
1	190.21	509.00	491.00	681.21	59
2	203.28	534.28	465.72	669.00	58
3	216.34	559.56	440.44	656.78	57
4	229.39	584.84	415.16	644.55	56
5	242.44	610.12	389.88	632.32	55
6	255.48	635.40	364.60	620.08	54
7	268.51	660.68	339.32	607.84	53
8	281.54	685.96	314.04	595.58	52
9	294.56	711.23	288.77	583.32	51
10	984307.57	998736.51	1001263.49	985571.06	50
11	320.57	761.79	238.21	558.78	49
12	333.56	787.06	212.94	546.50	48
13	346.55	812.34	187.66	534.21	47
14	359.53	837.61	162.39	521.92	46
15	372.50	862.89	137.11	509.61	45
16	385.47	888.16	111.84	497.30	44
17	398.42	913.44	086.56	484.99	43
18	411.37	938.71	061.29	472.66	42
19	424.32	963.99	036.01	460.33	41
20	984437.25	998989.26	1001010.74	985447.99	40
21	450.18	999014.53	1000985.47	435.64	39
22	463.10	039.81	960.19	423.29	38
23	476.01	065.08	934.92	410.93	37
24	488.91	090.35	909.65	398.56	36
25	501.81	115.62	884.38	386.19	35
26	514.70	140.89	859.11	373.81	34
27	527.58	166.16	833.84	361.42	33
28	540.45	191.43	808.57	349.02	32
29	553.32	216.70	783.30	336.62	31
30	984566.18	999241.97	1000758.03	985324.21	30
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	45

44	Log-us.	Hapfolo-g-us.	Anthapfo-log-us.	Antilog-us.	
30	984566.18	999241.97	1000758.03	985324.21	30
31	579.03	267.24	732.76	311.79	29
32	591.88	292.51	707.49	299.36	28
33	604.71	317.78	682.22	286.93	27
34	617.54	343.05	656.95	274.49	26
35	630.36	368.32	631.68	262.04	25
36	643.18	393.59	606.41	249.59	24
37	655.99	418.86	581.14	237.13	23
38	668.79	444.13	555.87	224.66	22
39	681.58	469.40	530.60	212.18	21
40	984694.36	999494.66	1000505.34	985199.70	20
41	707.14	519.93	480.07	187.21	19
42	719.91	545.20	454.80	174.71	18
43	732.67	570.47	429.53	162.20	17
44	745.43	595.73	404.27	149.69	16
45	758.17	621.00	379.00	137.17	15
46	770.91	646.27	353.73	124.65	14
47	783.65	671.54	328.46	112.11	13
48	796.37	696.80	303.20	099.57	12
49	809.09	722.07	277.93	087.02	11
50	984821.80	999747.34	1000252.66	985074.46	10
51	834.50	772.60	227.40	061.90	9
52	847.20	797.87	202.13	049.33	8
53	859.89	823.14	176.86	036.75	7
54	872.57	848.40	151.60	024.17	6
55	885.24	873.67	126.33	985011.57	5
56	897.91	898.93	101.07	984998.97	4
57	910.57	924.20	075.80	986.37	3
58	923.22	949.47	050.53	973.75	2
59	935.86	974.73	025.27	961.13	1
60	984948.50	1000000.00	1000000.00	984948.50	0
	Antilog-us.	Anthapfol.	Hapfolog-us	Log-us.	45

CANONIS
TRIANGULORUM
FINIS.

HAbes, Amice Lector, Canonem Triangulorum omnibus numeris emendatiſsimum, nam ubi detritus typus veſtigium nonnunquam debilius impreſſerat, vel calamo ſupplendum duximus, ut de ſumma numerorum integritate dubitare nihil quiſquam debeat. Scio non nullos ejusdem argumenti Canones polliceri ſimilem perfectionem, quorum tamen errata bene multa, eaq; nuſquam correcta vel indicata, producere poteram; ſed quod meum fuerat curâſſe ſat eſt. Vale.

SOLI DEO GLORIA.

ASTRONOMIA

SPHÆRICA

Decem Problematis

omnis ex fundamento

tradita

à

NICOLAO Kauffman Holsato.

DANTISCI,

Typos commodante Andreâ Hünefeldt.

ANNO cIↃ. IↃc. LI.

PROLEGOMENA.

UNius officio dieculæ Reginam seculorum Astronomiam, felices Animæ, demereri potestis. Ortum Patre luminum cognati Principes coluerunt Imperium Oceano, famam terminantes Astris; macti gloriâ, quibus Os Naturæ sublime dedit. Quid enim innumerabiles æternorum ignium copiæ, quid exultantium legionum pernix alacritas, quid fulgentissimus cœlestium arguit exercitus, nisi Imperatoris sui Virtutem ineffabilem & Sapientiam? quæ simul atq; in Heroum animis resplenduit, jam totum illud agmen munere suo defungitur, haut alium in finem unquam conditum. Quanquam non desunt interim vitæ quoq; communi utilitates sua longè amplissimæ. Naturali quidem Medicus feliciter auspicandæ, ac traducendæ suaviter præfectus, non igni magis & aquâ quàm siderali scientiâ indiget, Solis & Lunæ vices, temporumq; opportunitates, & quod palmarium est, effectuum insolitorum rationes edocente. Historiæ autem, Vitæ Civilis oculo, pulcherrima Mater filias educat longè nobilissimas: Chronologiam, quâ sine nulla unquam Respublica stetit, neq; stabit; Geographiam item, quæ parentem ore planissimè referens, non gesta solùm velut oculis subjicit; sed infinitis, ut militi, peregrinanti, mercatori, denique nulli non necessaria, nisi qui casam suam nunquam egressurus est. Agricolas sationis & messis tempora docet; Naucleris dux unica per vastum Oceanum, & quis omnes ejus commoditates recenseat? Quibus ut minùs multi potiantur, una difficultas obstat, & confusio sensus pervertens. Eam nos difficultatem exiguo, sed accurato & minimè vulgari scripto omnem sustulimus, eliminavimus, quod experienti fiet manifestum.

nifestum. Nam brevitas tantum abest, ut opusculum reddat obscurum vel imperfectum, ut plura hîc & magis perspicua inventurus sis, quàm usquam alibi. Alius enim Triangula Sphærica, quæ prorsus alteram alam suppeditant in cœlum sub volatur ne attingere quidem ausus est: Alius Trigonometriam sectatur veterem, per Sinus Tangentes, Secantes si non absterrens calculonem, certè ad nauseam usq; defatigans: Qui verò Logarithmos receperunt, vel Nepertanos illos usurpant signus suis Cossicis non nihil operosos; vel recentiores quidem admittunt, sed utrumq; genus tot casuum varietatibus involvunt, ut siquando ad Problematis Astronomici solutionem perventum est, non sufficiat Trigonometriam semel tradidisse tot regulis, sed Trianguli cujusq; analysis novis denuò regulis inculcanda sit. Inde adeò factum est, ut nemo hoc studium, alius potiùs, quàm sibi fructuosum, capessere velit, nisi qui vitam in eo consumere gauderi, pieriq; primoribus labris degustâsse sat habeant. Nostra methodus unam dieculam, vel biduum ad summum postulat, ut Astronomiam omnem ex fundamento hauriας. Id quod dissimulare haudquaquam debui, quando neq; Homeri opus absconditur muscâ,

Nec Iovis in fragili luditur orbe labor;

Sed invisibilis aulæa Regis sexcentis revelantur mentibus, quibus cupio, ut meus labor sit quàm commendatissimus & consequenter utilissimus.

ASTRO-

ASTRONOMIA SPHÆRICA.

SPhærica punctorum Cœli & Terræ situm exhibet, quoties opus & libitum est; & vicissim ex positu siderum tempus & locum nostrum conjicere docet.

Nimirum, ut in problematis solet, ex datis sive notis ubiq; ignotum elicitur: Illa autem data non nisi sensu per observationes acquiruntur. Sed enim quas experientia possedit rationes, prudentia solers in futurum prospexit, quæ observatis æquipollere queant. Itaq; nostris usibus Sphæricæ, quam molimur, operâ reconditæ sunt longitudines & latitudines punctorum terraquei globi in Abaco Geographico; siderumq; in Astronomia Theoricâ, vel ex hâc derivatis ephemeridibus: unde vicissim depromi possunt, versandis pro re natâ rursum prorsum problematis.

PROBLEMA I.

Datâ Longitudine Solis; Declinationem ejusdem, & Ascensionem rectam, nec non angulum Ecliptica & Meridiani invenire.

Notis, quæ Schematibus adjecta sunt, intelligatur ubiq;

P Polus.
Æ Q Æquator.
P P Circulus declinationis.
E Polus Ecliptica.
E C Ecliptica.
F F Circulus latitudinis.
♈ Intersectio Verna.

♎ *Intersectio Autumnalis.*
A Ascendens } *punctum Ecliptica.*
D Descendens }
Z Zenith.
N Nadir.
HO Horizon.
ZN Verticalis
Or Orientis } *cardo, polus Meridiani.*
Oc Occidentis }
Circulo integro Meridianus.
R Rectus angulus.
☉ *Sol.*
S Sidus, Sol vel Stella.
b borealis } *latitudo, declinatio, vel amplitudo.*
m meridionalis }

Fig. I mâ vel II dâ elige quadrantem, in quo Sol versatur, simul in △lo R ♈ ☉, vel R ♎ ☉

dantur praeter rectum ad R
1. Angulus ♈ vel ♎ 23°. 30′.
2. ♈ ☉ vel ♎ ☉, distantia Solis ab Æquinoctio propiori, numeranda ad gradum usq; Longitudinis.

quaeritur
1. R ☉ Declinatio Solis, pro signo, quod occupat, borea vel meridionalis.
2. ♈ R vel ♎ R arcus, qui in quadrante Æquatoris
   1. manet
   2. subtractus ex 180° fit
   3. additus ad 180° fit
   4. subtractus ex 360° fit
   } Ascensio Recta ☉lis.
3. Ang. ☉ Eclipticæ & Meridiani.

Exemplum I. *Detur* Longitudo Solis 27°. 32′. 35″. ♌. Sol versatur in 4to quadrante, ergo ♈ ☉ distantia ab Æquinoctio propiori est 2°. 27′. 25″. *Invenitur* 1. R ☉ Declinatio Solis 5°. 8′. 46″. 2. ♈ R 2°. 15′. arcus, subtrahendus ex 360°, relinquitur Ascensio recta Solis 357°. 45′. 3. Angulus ☉ Eclipticæ & Meridiani 66°. 30′. 22″.

Exem-

Exemplum II. *Detur* Longitudo Solis 4°. 13'. ♉. *Invenitur* 1. Declinatio Solis 23°. 26'. 2. Angulus Ecliptiæ & Meridiani 88°. 10'.

Exemplum III. *Detur* Longitudo Solis 29°. 21'. ♎. *Invenitur* 1. Declinatio Solis 11°. 16'. 2. Angulus Ecliptiæ & Meridiani 69°. 15'.

CONVERSA.

Datâ Declinatione vel Ascensione rectâ Solis; Longitudinem ejusdem invenire.

Electo quadrante, in quo Sol versatur, in △lo R ♈ ⊙ vel R ♎ ⊙

dantur { 1. Ang. ♈ vel ♎ 23°. 30'.
2. Crus alterutrum, R ⊙ Declinatio Solis, vel R ♈ (R ♎) arcus in Æquatore numerandus ab Æquinoctio propiori ad gradum usq; Ascensionis rectæ.

præter rectum ad R

quæritur { ♈ ⊙ vel ♎ ⊙ distantia Solis ab Æquinoctio propiori, quâ inventâ facilè supputabis gradum Longitudinis, quem Sol obtinet.

Exemplum. *Detur* Ascensio recta Solis 357°. 38'. *Invenitur* Longitudo Solis 27°. 25'. ♓.

PROBLEMA II.

Datâ Longitudine & Latitudine sideris extra Ecliptica sita; Declinationem ejusdem, & Ascensionem rectam invenire.

Cùm Longitudo sideris incidit in signum aliquod { ascendens, Fig. III^tiâ / descendens, Fig. IV^tâ } elige △gulum PFS, pro latitudine sideris boreum vel meridionale, in quo

dantur protinus
1. PF Distantia polorum Æquatoris & Ecliptica $23^{\circ}.30'$.
2. Ang. F, quem mensurat arcus Ecliptica interceptus cruribus FP & FS, quorum hoc Longitudinem sideris productum, illud punctum solstitiale offendit.
3. FS Complementum latitudinis datæ sideris.

quæritur
1. PS Complementum Declinationis.
2. Ang. P, quem mensurat arcus Æquatoris interceptus cruribus PF & PS, quorum hoc Ascensionem rectam sideris, illud gradum Æquatoris 270^{mum} vel 90^{mum} offendit.

Exemplum. *Detur* Capitis Andromedæ, quæ est stella secundæ magnitudinis, Longitudo ad annum currentem 1651 gr. ad. 9. $29'$ ♈. & Latitudo $25^{\circ}.42'$. b. Longitudo sideris incidit in ♈tem signum ascendens; ergo Fig. IIItiâ eligis △lum PFS, exigente latitudine, boreum, in quo *dantur* 1. PF Distantia polorum Æquatoris & Ecliptica $23^{\circ}.30'$. 2. Ang. F, quem mensurat arcus Ecliptica interceptus cruribus FP & FS, quorum hoc productum offendit Longitudinem sideris $9^{\circ}.29'$ ♈. illud puncto solstitiali ♋ occurrit: numerantur autem à $9^{\circ}.29'$ ♈ ad initium usq; ♋ $80^{\circ}.31'$. tantus est igitur Angulus F. 3. FS Complementum Latitudinis datæ sideris $64^{\circ}.18'$. *Invenitur* 1. PS complementum Declinationis $62^{\circ}.49'$. ergo Declinatio stellæ est $27^{\circ}.11'$. 2. Ang. P $87^{\circ}.38'$. addendus ad 180°, ut fiat Ascensio recta stellæ $357^{\circ}.38'$.

CONVERSA.

Datâ Declinatione, & Ascensione rectâ sideris; Longitudinem ejusdem, & Latitudinem invenire.

Cùm Ascensio recta sideris incidit in quadrantem Æquato-

Æquatoris { primum vel quartum, Fig. III^tia / secundum vel tertium, Fig. IV^tà } elige

△lum PFS pro declinatione sideris boreum vel meridionale, in quo

dantur protinus
1. PF Distantia polorum Æquatoris & Ecliptice 23°. 30'.
2. PS Cõplementũ Declinationis datæ sideris.
3. Ang. P, quem mensurat arcus Æquatoris interceptus cruribus PF & PS, quorum hoc Ascensionem rectam sideris productum, illud gradum Æquatoris 270^mum vel 90^mum offendit.

quæritur
1. Ang. F, quem mensurat arcus Eclipticæ interceptus cruribus FP & FS, quorum hoc Longitudinem sideris, illud punctum solstitiale offendit.
2. FS Complementum latitudinis.

PROBLEMA. III.

Datâ Elevatione poli, & Declinatione sideris: differentiam ejus ascensionalem, & ex hac (nec non Ascensione rectâ sideris pariter datâ) Ascensionem obliquam, itemq; Descensionem obliquam, arcum semidiurnum, moram sideris supra & infra Horizontem; Amplitudinem ortivam & occiduam; Angulum denique Orientis (sc. puncti Ecliptica) invenire.

Fig. V^tâ in △lo R Or. S, pro Declinatione sideris, boreo vel meridionali

dantur præter rectum ad R
1. Ang. Or, qui est Æquatoris & Horizontis, Dantisci 35°. 37'.
2. RS Declinatio sideris data.

Quæritur

1. Or. R Differentia ascensionalis, quæ declinante sidere versùs

Polũ
- Elevatum
  - Detracta ex Ascensione rectâ dat Ascensionem obliquam.
  - Addita
    - Ascẽsioni rectæ dat Descensionẽ obliquam.
    - Nonaginta gradibus dat arcum semidiurnum.
- Depressũ
  - Addita Ascensioni rectæ dat Ascensionem obliquam.
  - Detracta ex
    - Ascẽsione rectâ dat descensionem obliquam.
    - Nonaginta gradibus dat arcum semidiurnum.

Arcus semidiurnus in horas conversus dat dimidiatam sideris moram supra Horizontem, cujus complementum ad 12 horas est dimidiata mora infra Horizontem.

2. Or. S Amplitudo ortiva, pro Declinatione, borea vel meridiõnalis, cui æqualis est Amplitudo occidua.

3. Angulus S, qui subtra- & 9 in signis
- Ascendentibus ex angulo Ecliptice & Meridiani
- Descendẽtibus ex complemento anguli Ecliptice & Meridiani ad 180

} dat angulũ Oriẽtis.

Exemplum I. *Detur* Elevatio poli $54^{\circ}.23'$. & Declinatio Solis $\S 8^{\circ}.46''.$ m. In ΔlO R Or. S, exigente Declinatione, me-

ne, meridionali dantur præter rectum ad R 1. Ang. Or. 35°. 37'. 2. Declinatio Solis 18°. 46'. *Invenitur* 1. Or. R. Differentia ascensionalis 1°. 22'. quæ, declinante hîc Sole versus polum depressum, addita Ascensioni rectæ suprà inventæ 357°. 45'. dat Ascensionem obliquam 359°. 7'. detracta verò ex eadem Ascensione rectâ 357°. 45'. dat Descensionem obliquam 356°. 23'. detracta item ex 90°, dat arcum semidiurnum 88°. 38'. qui in horas conversus dat dimidiatam Solis moram supra Horizontem 5. hor. 54'. 32''. cujus complementum ad 12 horas est dimidiata Solis mora infra Horizontem 6 hor. 5'. 28''. Duplicetur autem illa superna mora, fiet Longitudo diei 11 hor. 49'. 4''. & hæc infera, fiet Longitudo noctis 12 hor. 10'. 56''. 2. Or. S Amplitudo ortiva Solis 1°. 41'. m. 3. Ang. S 54°. 24'. qui subtractus, quando hoc loco signum est Ascendens ♈, ex angulo Ecliptica & Meridiani suprà invento 66°. 30'. 22'', dat angulum Orientis puncti Ecliptica 12°. 6'. 22''.

Exemplum II. *Detur* Elevatio poli 54°. 23'. & Declinatio Capitis Andromedæ 27°. 11'. *Invenitur* Differentia ascensionalis 45°. 48'. Amplitudo ortiva 51°. 40'. b. Ascensio obliqua 311°. 50'. Descensio obliqua 43°. 26'. Arcus semidiurnus 135°. 48', Mora stellæ supra Horizontem 18 hor. 6'. 24''. & infra Horizontem 5. hor. 53'. 36''.

CONVERSA.

Datâ Declinatione Solis & Longitudine diei; Elevationem poli invenire.

In △lo R Or. S, pro Declinatione, boreo vel merid.

dantur præter rectum ad R
1. R S Declinatio Solis.
2. R Or. Differentia ascensionalis, quam exhibet tempus, quo Longitudo diei data 12 horis major vel minor est, dimidiatum & in gradus conversum.

quæritur Angulus Or. Complementum Elevationis poli.

Exem-

Exemplum. *Detur* Declinatio Solis maxima $23^{\circ}.30'$. b. simulq; longissima dies Dantisci 16 hor. $59'$. In △lo R Or. S, exigente Declinatione, boreo *dantur* præter rectum ad R 1. R S Declinatio Solis $23^{\circ}.30'$. 2. R Or. Differentia ascensionalis, quam acquires, si temporis, quo longissima dies superat 12 horas, nimirum 4 hor. $59'$. dimidium 2 hor. $29'\frac{1}{2}$. convertas in gradus, fiunt $37^{\circ}.22'\frac{1}{2}$. *Invenitur* Angulus Or. $33^{\circ}.37'$. cujus complementum $54^{\circ}.23'$. est Elevatio poli quæsita.

PROBLEMA IV.

Datâ Ascensione obliquâ stellæ; Ortum ejus Cosmicum, Acronychum, Heliacum invenire.

Cosmicus ortus vel occasus idem est qui matutinus; *Acronychus* autem vespertinus, ille oriente Sole, hic occidente contingens: *Heliacus* ortus est cùm stella ex radiis Solis emergere; occasus cùm iisdem occultari incipit. Ut verò stellæ conspiciantur, certa requiritur Solis infra Horizontem depressio, qui arcus visionis appellatur, estq; pro luce sideris, major vel minor. Ex Ptolemæi sententia Venus arcum postulat 5° graduum, quanquam in maximis elongationibus vel interdiu conspicitur; Jupiter & Mercurius 10°; Saturnus 11°; Mars $11^{\circ}\frac{1}{2}$; Fixæ primæ magnitudinis 12°; secundæ 13°; tertiæ 14°; quartæ 15°; quintæ 16°; sextæ 17°; nebulosæ denique 18°.

Cùm Ascensio obliqua stellæ incidit

in quadrantem Æquatoris { primum, Fig. VI tâ / secundum, Fig. VII mâ / tertium, Fig. VIII vâ / quartum, Fig. IX nâ }

in △lo ♈ Or. A vel ♎ Or. A

dantur

dantur
1. Ang. ♈ vel ♎ 23°. 30′.
2. Ang. Or. qui est Æquatoris & Horizontis, Dantisci 35°. 37′.
3. ♈ Or. vel ♎ Or. distantia Ascensionis obliquæ ab Æquinoctio propiori.

quæritur ♈ A vel ♎ A. Estq; A punctum Ecliptice, quod unà cum stella ascendit. Quando igitur Sol hoc punctum occupat, stella oritur Cosmicè; cùm verò Sol tenet punctũ Ecliptice puncto A oppositũ, stella oritur Acronycè.

Porrò in △lo R A ⊙

dantur præter rectum ad R
1. R ⊙ Arcus visionis dato sideri competens.
2. Angulus Orientis puncti A per Problema tertium acquisitus.

quæritur A ⊙ arcus, addendus puncto A, ut obtineas punctum ⊙, quod cum Sol occupat, stella oritur Heliacè.

Exemplum. Caput Andromedæ Dantisci oritur Cosmicè cum 4to. gr. 13 ♑; Acronycè cum 4. 13 ♋. Declinatio 4ti gradûs 13 ♑ est per Problema Imum 23°. 26′. & angulus, quem idem gradus cum Meridiano facit 88°. 10′. Angulus autem, quem circulus Declinationis per 4tum gr. 13 ♑ actus cum Horizonte facit, Problemate IIdo insignitus literâ S, 62°. 22½′. Angulus Orientis 4ti gr. 13 ♑. 25°. 47½′. Oriturq; Caput Andromedæ Heliace, cum Sol est in ♑. 21 ♓.

PROBLEMA V.

Datâ Elevatione poli, & Descensione obliquâ stellæ; Occasum ejus Cosmicum, Acronychum, Heliacum invenire.

Cùm Descensio obliqua stellæ incidit in quadrantem

Æquatoris { primum, Fig. X / secundum, Fig. XI / tertium, Fig. XII / quartum, Fig. XIII } in △lo ♈ Oc. D vel ♎ Oc. D

dantur

dantur
1. Ang. ♈ vel ♎ $23^{\circ}.30'$.
2. Ang. Oc. qui est Æquatoris & Horizontis, Dantisci $35^{\circ}.37'$.
3. ♈ Oc. vel ♎ Oc. distantia Ascensionis obliquæ ab Æquinoctio propiori.

quæritur ♈ D vel ♎ D. Estq; D punctum Eclipticæ, quod unà cum stella descendit. Quando igitur Sol hoc punctum occupat stella occidit Acronycè; cùm verò Sol tenet punctum Eclipticæ puncto A oppositum, stella occidit Cosmicè.

Porrò in △lo R D ⊙

dantur præter rectum ad R
1. R ⊙ Arcus visionis dato sideri competens.
2. Angulus D, æqualis angulo Orientis eodem momento pũcti Eclipticæ, huic nimirum puncto D oppositi, per Probl. IIIcium acquisitus.

quæritur D ⊙ arcus, detrahendus puncto D, ut obtineas punctũ ⊙, quod cùm Sol occupat, stella occidit Heliacè.

Exemplum. Caput Andromedæ Dantisci occidit Acronycè cum $29^{\circ}.21'$ ♈; Cosmicè cum $29^{\circ}.21'$ ♎. Declinatio 29ni gradûs $21'$ ♎ est per Problema Imum $11^{\circ}.16'$. & angulus, quem idem gradus cum Meridiano facit $69^{\circ}.15'$. angulus autem, quem circulus Declinationis per 29num gr. $21'$ ♎ actus cum Horizonte facit, Problemate IIItio insignitus literâ ☉, $55^{\circ}.59'$. Angulus Orientis 29ni gr. $21'$ ♎ est $54^{\circ}.46'$. Occiditq; Caput Andromedæ Heliacè, cùm Sol est in $13^{\circ}.22'$ ♈.

CONVERSA IVta & Vta.

Datâ Elevatione poli, Ascensione obliquâ vel Descensione obliquâ stellæ, & Longitudine Solis; an stella conspiciatur Heliacè, definire.

In △lo

In △lo R A ⊙ vel R D ⊙

dantur præter rectum ad R
1. Angulus Orientis puncti A vel occidentis puncti D per Probl. III^tium acquisitus.
2. A ⊙ vel D ⊙ arcus inter Longitudinem Solis & Ascensionem Descensionemve stellæ obliquam interceptus.

quæritur R ⊙ arcus, qui si major vel æqualis est arcui visionis datæ stellæ, conspicitur utique; sin minor, sub radiis Solaribus delitescit.

Nota. Quandoq; angulus Orientis minor est arcu visionis; hunc ergo subtrahes à depressione Æquatoris sub Horizontem (quæ nobis est 35°. 37'.) relinquitur Declinatio borea gradus Eclipticæ, quem oportet Solem assecutum, ut vel mediâ nocte demum incipiat stella comparere.

Exemplum. Capitis Andromedæ, quæ est stella secundæ magnitudinis, arcus visionis est 14°. hic subtractus à 35°. 37'. relinquit 21°. 37'. Declinationem boream competentem per cõversum Problema Imum gradui 7^mo. 33' ♊. nec non 22^do gr. 27' ♋. Dum igitur Sol peragrat arcum Eclipticæ à 7°. 33' ♊ ad 22°. 27' ♋, Caput Andromedæ Dantisci nec mediâ nocte conspicitur, impediente crepusculo. Idem intelligatur de cæteris omnibus stellis secundæ magnitudinis.

PROBLEMA VI.

Datâ Elevatione poli & Longitudine Solis; initium crepusculi matutini, & finem vespertini invenire.

Quam primùm Sol ab imo Æquatoris puncto versus elevatum polum auctâ Declinatione adrepsit, ut vel mediâ nocte vix 18° sub Horizontem deprimatur, jam perpetuo crepusculo noctes æstivæ albicãt, usq; dum Sol ad Æquatorem redeundo vicissim hunc limitem transeat. Subtrahe 18° à depressione Æquatoris (quæ nobis est 35°. 37'.) relin-

relinquitur Declinatio borea 17°. 37′. qualis est per Conversum Probl. Imum 20mi gradûs ♉, nec non 10mi gradûs ♌. Dum igitur Sol peragrat arcum Eclipticæ à 2° ♉ ad 1° ♌, crepuscula totas noctes durant.

Cæteris anni temporibus Fig. XIVta in △lo PN ⊙, pro Declinatione Solis, boreo vel meridionali

dantur
1. P N Distantia polorum Æquatoris & Horizontis, Dantisci 35°. 37′.
2. N ⊙ 72°, complementum sc. depressionis Solis sub Horizontem, quæ requiritur 18°, ut crepuscula incipiant vel desinant.
3. P ⊙ complementum Declinationis Solis quadrante { majus, Sole in borealibus. / minus, Sole in australibus.

quæritur Ang. P, convertendus in horas, quæ { numeratæ à mediâ nocte, ostendunt initium crepusculi matutini. / subtractæ à 12 horis, ostendunt finem crepusculi vespertini.

Exemplum. Cùm Sol est in 27°. 32′. 35″. ♑ Dantisci initium crepusculi matutini incidit in horam 3. 58′. vespertini autem finis in 8. hor. 2′.

Problema VII.

Datâ Elevatione poli, nec non Altitudine sideris, cujus simul Declinatio & Ascensio recta nota sit; temporis momentum, & sideris Azimuthum invenire.

Sol meridie culminat. Hujus Ascensionem rectam aufer ab Ascensione rectâ stellæ. Residuum conversum in horas ostendit, quot horis post meridiem stella culminet.

Quan-

Quando sidus est in

plaga { Orientali, Fig. XV tâ / Occidentali, Fig. XVI tâ } in △lo PZS

dantur
1. PZ Distantia polorum Æquatoris & Horizontis, Dantisci 35°. 37′.
2. ZS complementum Altitudinis datæ sideris.
3. PS complemẽtum Declinationis datæ sideris.

quæritur
1. Ang. P, convertendus in horas, momento culminationis { Fig. XV detrahendas / Fig. XVI addendas } ut emergat tempus observationis.
2. Ang. Z Azimuthum sideris.

Exemplum. *Detur* in plaga Orientali Altitudo Capitis Andromedæ 6°. 18′. sub El. poli 54°. 23′. *Invenitur* 1. tempus 3 hor. 58′. antemeridianum. 2. Azimuth stellæ 50°. 34′. numerandi à cardine boreæ versus Ortum.

CONVERSA.

Dato tempore; dati sideris Altitudinem & Azimuth invenire.

In eodem △lo PZS

dantur
1. PZ Distantia polorum Æquatoris & Horizontis, Dantisci 35°. 37′.
2. PS complementum Declinationis datæ sideris.
3. Ang. P, si moram, quæ est inter datum tempus & momentum culminationis proximæ, convertas in gradus.

quæritur
1. ZS complementum Altitudinis.
2. Ang. Z Azimuth sideris.

PROBLEMA VIII.

Datâ Longitudine & Latitudine duorum punctorum Cœlestium vel Terrestrium (vel Declinatione & Ascensione rectâ duorum cœlestium;) Distantiam eorum invenire.

I Casus. Cùm Longitudinem eandem habent duo loca, Latitudinum differentia, si sint in eodem hemisphærio boreo vel meridionali, vel summa, si in diversis, exhibet distantiam quæsitam.

II Casus. Cùm Latitudinem eandem habent; Fig. XVII^ma in △lo PRS

dantur præter rectum ad R { 1. PS complementum Latitudinis. 2. Ang. P semidifferentia Longitudinis.

quæritur crus RS, quod duplicatum exhibet distantiam quæsitam.

III Casus. Cùm differunt Longitudine & Latitudine simul.

Fig. XIIX^va vel XIX^na in △lo PSS

dantur { 1. PS & alterum PS complementa sc. Latitudinum; utrumq; quadrante minus, cùm data puncta sunt in eodem hemisphærio boreali vel australi, ut Fig. XIIX: aliàs cùm data puncta sunt in diversis hemisphæriis, ut Fig. XIX; alterũ complementum Latitudinis est quadrante majus (additis sc. 90° ad Latitudinem datam) alterum verò minus. 2. Ang. P Differentia Longitudinum, quæ si fortè 180° excedat, sume complementum ejus ad integrum circulum.

quaritur SS distantia punctorum.

Nota,

Nota. In Terrestri sphæra distantiam inventam convertes in milliaria, computando pro quolibet gradu 15.

CONVERSA.

Datâ Latitudine (vel Declinatione) & distantiâ duorum punctorum; differentiam Longitudinis (Ascensionis rectæ) invenire.

In eodem △lo PSS

dantur { 1. PS & alterum PS complementa Latitudinũ.
2. SS distantia punctorum.

quæritur Angulus P differentia Longitudinis.

PROBLEMA IX.

Dato tempore & Latitudine loci; Thema Cœli erigere.

Ascensioni rectæ Solis adjicito arcum Æquatoris inde à meridie elapsum, aggregatum (abjectis cùm opus est 360) est Ascensio recta Medii Cœli, cui respondentem gradum Ecliptice supputabis per conversum Probl. Imum, is erit cuspis domus 10mæ. Tum Ascensioni rectæ M. C. adde 30, mox 60, inde 90, tum 120, tandem 150, ita colliges Ascensionem obliquam domus 11mæ, 12mæ, 1mæ sive Horoscopi, 2dæ, 3tiæ.

Fig. XXmâ in △lo HÆ 11 (HÆ 12)

dantur præter rectum ad Æ { 1. HÆ Elevatio Æquatoris supra Horizontem. Dantisci 35. 37.
2. Æ 11, 30 (60.)

quæritur Ang. Æ 11 H, 55. 5. (Æ 12 H, 39. 36.) cui æqualis est Ang. Q3 O (Q2 O.) Hi anguli semel inventi in nostra Elevatione poli semper erunt usui. Ostendunt enim, quantum Æquator elevari debeat supra circulum

positionis quemlibet (vel Horizontem, qui potest illorum vicem gerere.) Itaq; per Probl. IV tum Dato angulo Æquatoris & Horizontis, nec non Ascensione obliquâ cujusq; domûs; investigabis gradum Eclipticæ simul ascendentem, qui tum erit cuspis suæ quisq; domûs. Sufficit autem computâsse cuspides Orientalium domorum, quæ enim his opponuntur, veluti decimæ quarta, undecimæ quinta, &c. totidem gradus & minuta numerant, sed signi oppositi.

Exemplum. Ad annum 1651, mensis Martii diem 17. horam à meridie 15. 58′. sub Elevatione poli Dantiscana 54°. 23′. sit erigendum Thema Cæli. Ascensioni rectæ Solis Probl. Imo inventæ 357°. 45′. adjicio arcum Æquatoris inde à meridie spatio horarum 15. 58′. elapsum, qui est 239°. 30′. aggregatum, abjectis 360°, est A. R. M. C. 237°. 15′. cui respondet per Conversum Probl. Imum 19°. 28 ♏. quæ est cuspis domus 10mæ. Deinde colligo Ascensiones obliquas domorum 11mæ 267°. 15′. 12mæ 297°. 15′. 1mæ 327°. 15′. 2dæ 357°. 15′. 3tiæ 27°. 15′. inventisq; Fig. XX mâ angulis Æ 11 H 55°. 5′ (cui æqualis est ☌ 3 ☋) nec non Æ 12 H 39°. 36′ (cui æqualis ☌ 2 ☋) per Probl. IV tum inveltigo cuspides domorum 11mæ 12°. ♑. 12mæ 25°. 58′ ♐. 1mæ 21°. 38′ ♑. 2dæ 23°. 42′ ♓. 3tiæ 10°. 27′ ♉. Porrò quoniam 10mæ opponitur 4ta, hæc totidem numerabit 29°. 28′. sed signi oppositi ♉. Similiter 5ta totidem quot 11ma 12°. 7′. sed oppositi signi ♊. 6ta 25°. 58′ ♊. 7ma. 21°. 38′ ♋. 8va 23°. 42′ ♍. 9na 10°. 27′ ♍. Sic erectum est Thema Fig. XXImâ, cui interim ex ephemeridibus inscripsi loca Planetarum, & singulorum Latitudines subjeci.

PROBLEMA X.

Erecti Thematis punctum quodlibet ad punctum quodlibet aliud dirigere.

1. Punctum quod dirigitur, vocatur aliàs locus primus, vel *Significator*. Illud autem, ad quod dirigimus, locus secundus, vel *Promissor*. Diriguntur autem Significatores, quò tendunt: *Directi*, i. dest, secundum signorum seriem

ſeriem incedentes, in conſequentia; *Retrogradi* verò in antecedentia, ſive contra ſignorum ſucceſſionem.

2. Per Significatorem quemlibet directum; vel per Promiſſorem, ad quem Retrogradus dirigitur, circulus poſitionis actus vocetur *Horizon ſtellæ*. Eſtq; vel *rectus*, per utrumq; polum incedens, ut Meridianus; vel *obliquus*, alterutrum polum habens elevatum.

3. Hic (obliquus) nonnunquam idem eſt, qui Horizon loci, & conſequenter Elevatio poli eadem. Quando verò, quod plerumq; accidit, diverſus eſt; oportet ut inveſtigemus priùs, quantum polus alteruter ſupra ipſum (Horizontem ſtellæ) elevetur. Quod ſi igitur ſtella

ſit { Orientalis cum Declinatione { boreâ, Fig. XXII / merid. Fig. XXIII
Occidentalis cum Declinatione { boreâ, Fig. XXIV / merid. Fig. XXV

in △lo P O S vel P H S, pro ſitu ſtellæ, ſupero vel infero

dantur
1. P O vel P H Elevatio poli, Dantiſci 54. 23.
2. P S Complementũ Declinationis ſideris datæ.
3. Ang. P, quem menſurat arcus Æquatoris interceptus cruribus P O (PH) & P S, quorum hoc Aſcenſionem rectam ſideris productum, illud Medii vel Imi Cæli (Aſcenſionem rectam) offendit.

quæritur Ang. O vel H.

Rurſus in △lo R P O vel R P H (diverſi hemiſphærii quando nuper inventus O vel H excedit quadrantem)

dantur præter rectum ad R
1. P O vel P H Elevatio poli.
2. Ang. O vel H nuper inventus, vel ſi is excedat quadrantem, complementum ejus ad 180.

quæritur R P Elevatio poli ſupra Horizontem ſtellæ.

4. Cognitâ Elevatione, per Probl. III quæratur, cùm Horizon agitur per stellã { Orientalem, Ascensio / Occidentalẽ, Descẽsio } obliqua tam Significatoris, quàm Promissoris.

5. Inventa { Significatoris directi / Promissoris, ad quem / Retrogradus dirigitur } Ascensio Descẽsione, pro Horizonte stellæ, recta vel obliqua subtrahatur ex alterius termini Ascensione vel Descensione simili (subfectis, cùm opus est, 360°) residuum est *arcus Directionis* quæsitus.

Exemplum I. In Horoscopo nostri Thematis Fig. XXI ♀nus secundum Longitudinem 7 ferè gradibus ☽nam post se relinquit. Unde qui nudum vocabulum *Directionis secundum signorum successionem* spectat, existimet ☽nam propiùs dirigi ad ♀rem, quàm hanc ad illam. Quid si autem ♀nus Horizonti proxima integrâ amplius horâ ascendit citiùs quàm ☽na? quod magnâ Latitudine in diversum abeuntibus accidit. Itaq; consultum est, ut qui Thematis oblati Directiones omnes persequi volet, præter cujusq; loci Declinationem & Ascensionem rectam per Probl. Imum vel Idum acquisitas, Elevationem quoq; poli supra Horizontem cujuslibet stellæ per hoc Probl. ultimum prospiciat. Ita non solùm certus erit, quem locum quorsum dirigat; sed etiam expeditiùs operabitur. Dirigatur ergo ♀nus ad ☽nam. Declinatio ♀ris per Probl. II est 1°. 5'. m. & Asc. recta 320°. 37'. ☽næ autem Declinatio 21°. 45'. m. & Asc. recta 317°. 5'. Acto per ♀rem (significatorem directum) Horizonte; quoniam ♀ est Or. cum decl. merid. Fig. XXIII in △lo P H S infero (quoniam ♀ sita est infra Horizontem) *dantur* 1. P H 54°. 23'. 2. P S Complementum Declinationis ♀ris 79°. 55'. 3. Ang. P, quem mensurat arcus Æquatoris ab Ascensione rectâ M. C. 237°. 15'. ad Asc. rectam ♀ris 320°. 37'. numeratus: 83°. 22'. *Invenitur* Ang. H 85°. 34'. Rursus in △lo R P H rectangulo ad R *dantur* 1. P H 54°. 23'. 2. Ang. H nuper inventus 85°. 34'. *Invenitur* R P Elevatio poli supra Horizontem ♀ris 54°. 9'. Ad hanc Eleva-

Elevationem per Probl. III quæritur, quando Horizon hîc agitur per stellam *Orientalem*, *Ascensio* obliqua tam ♀ris 334°. 54′. quàm ☽næ 350°. 36′. Inventa ♀ris (Significatoris directi) Ascensio obliqua, subtrahitur ex Ascensione itidem obliquâ ☽næ; residuũ est *arcus Directionis* ♀ris ad ☽nam 15°. 44′.

Exemplum II. Dirigatur ♂ Retrogradus ad ♄num. Declinatio ♂tis per Probl. II est 4°. 18′. m. & Asc. recta 197°. 46′. ♄ni autem Declinatio 22°. 55′. b. & Asc. recta 98°. 41′. Acto per ♄num (promissorem, ad quem Retrogradus dirigitur) Horizontes; quoniam ♄nus est Occ. cum decl. bor. Fig. XXIV in △lo PHS infero ex *datis* 1. PH 54°. 23′. 2. PS 67°. 5′. 3. Angulo P ab Asc. rectâ Imi Cœli 57°. 15′. ad Asc. rectam ♄ni 98°. 41′. numerato graduum 41°. 26′. *Invenitur* Ang. H 98°. Rursus in △lo RPO (diversi hemisphærii, quando nuper inventus H excedit quadrantem) rectangulo ad R *dantur* 1. PO 54°. 23′. 2. Anguli H nuper inventi (quoniam excedit quadrantem) complementum ad semicirculum: 82°. 0′. *Invenitur* R P Elevatio poli supra Horizontem ♄ni 53°. 37′. Ad hanc Elevationem per Probl. III quæritur, quando Horizon hîc agitur per stellam *Occidentalem*, *Descensio* obliqua tam ♂tis 191°. 55′. quàm ♄ni 133°. 42′. Inventa ♄ni (Promissoris, ad quem Retrogradus dirigitur) Descensio obliqua, subtrahitur ex Descensione itidem obliquâ ♂tis; residuum est *arcus Directionis* ♂tis ad ♄num 58°. 13′.

CONVERSA.

Dato Significatoris cujuslibet arcu Directionis; quò perventurus sit, indagare.

Supra *directi* Significatoris Horizontem Elevatio poli quæratur, ut antè; & ad eam Elevationem acquires per Problema tertium ejusdem Significatoris { Orientalis, Ascensionem / Occidentalis, Descensionem } obliquam, cui inventæ addes arcum Directionis datum; ita conflabis obliquam { Ascensionem, / Descensionem, } cui per Probl. { IVtum / Vtum } respondens gradus Eclipticæ (sed ad Elevationem poli su-

pra Horizontem Significatoris computatus) est ipse locus, ad quem hoc (dato) arcu Directionis Significator perveniet.

Exemplum. Significator *directus* sit ♀, & arcus Directionis 45°. 11'. Decl. ♀vis est per Probl. II 21. 12. m. & Asc. recta 248°. 35'. Iam quia ♀ est Or. cum decl. merid. Fig. XXIII in △lo P H S supero (quoniam ♀ situs est supra Horizontem) *dantur* 1. P H 54°. 25'. 2. P S 68°. 48'. 3. Ang. P, quem mensurat arcus Æquatoris ab Asc. rectâ M. C. ad Asc. rectam ♀vis numeratus 11°. 26'. *Inuenitur* Ang. H 142°. 28'. Rursus in △lo R P O (diversi hemisphærii, quando nuper inventus H excedit quadrantem) rectangulo ad R *dantur* 1. P O 54°. 13'. 2. Anguli H nuper inventi (quoniam excedit quadrantem) complementum ad semicirculum: 37°. 32'. *Inuenitur* R P Elevatio poli supra Horizontem ♀vis 20°. 41'. Ad hanc Elevationem, ♀vis *Orientalis Ascensio* obliqua per Probl. III est 261°. 21', cui si addas arcum Directionis datum 45°. 11'. conflabis obliquam Ascensionem 306°. 32'. cui per Probl. IV respondens 21°. 38' ♑ (ad Elevationem poli supra Horizontem ♀vis computatus) est ipse locus, ad quem ♀ hoc arcu Directionis graduum 45°. 11'. perveniet, nimirum ad ipsum Horoscopum.

Sed *Retrogradi* Significatoris Ascensioni rectæ detrahes arcum Directionis datum, relinquitur gradus Æquatoris, quem Significator Retrogradus offendit Directione provolutus ad Promissorem. Per hunc gradum (diligenter notandum) circulus Positionis actus, erit Horizon Promissoris, supra quem Elevatio poli quæratur, prorsus ut antè. Nam si gradus ille notatus incidat in

plagam cœli { Orientalem, declinante Significatore in { boream, Fig. XXII / meridiē, Fig. XXIII
Occidentalem, declinãte Significatore in { boreã, Fig. XXIV / meridiē, Fig. XXV

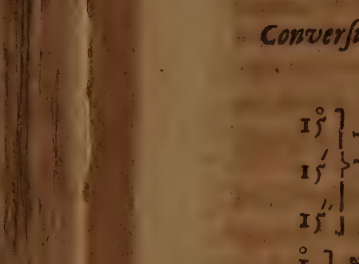
in △lo P O S vel P H S, pro situ notati gradûs, supero vel infero, ex *datis* ut suprà (dum Angulus P numeretur in Æqua-

Æquatore, non ab Asc. rectâ Significatoris; sed à gradu illo sæpius notato ad Medium vel Imum Cœlum) *quaeritur* Ang. O vel H; & porrò in altero △lo ipsa RP Elevatio poli supra Horizontem Promissoris. Ad hanc Elevationem acquires per Probl. III, Significatoris, si notatus ille gradus fuerit { Orientalis, Ascensionem / Occidentalis, Descensionem } obliquam, cui inventæ detrahes arcum Directionis datum; residuum erit obliqua { Ascensio, / Descensio, } cui per Probl. { IVtum / Vtum } respondens gradus Eclipticæ (sed ad Elevationem poli supra Horizontem Promissoris computatus) est ipse locus, ad quem hoc (dato) arcu Directionis Significator perveniet.

Exemplum. Significator *Retrogradus* sit ♂, & arcus Directionis 58°. 13′. Decl. ♂tis est per Probl. II 4°. 18′. m. & Asc. recta 197°. 46′. huic detrahe arcum Directionis datum 58°. 13′. relinquitur gradus Æquatoris 139°. 33′. Per hunc (diligenter notatum) agitur Horizon Promissoris, Iam quia gradus notatus incidit in plagam cœli occidentalē (offenditur enim quâ parte ab Imo Cœli 5°. 1′. secundum signorum seriem numerando ascendimus ad Medium Cœlum 23°. 15′.) declinante ♂te in meridiem, Fig XXV in △lo P O S infero (quoniam notatus gradus situs est infra Horizontem, propior sc. Imo, quàm Medio Cœlo) ex *datis* 1. PO 54°. 23′. 2. PS 85°. 42′. 3. Angulo P, à gradu sæpius notato 139°. 33′. ad Asc. rectam Medii Cœli 237°. 15′. numerato graduum 97°. 42′. *Invenitur* Ang. O 82°. 1′. & porrò in altero △lo ipsa RP Elevatio poli supra Horizontem Promissoris 53°. 37′. Ad hanc Elevationem, quando notatus gradus est *Occidentalis, Descensio* obliqua ♂tis per Probl. III est 191°. 55′, cui si detrahis arcum Directionis datum 58°. 13′. relinquitur Descensio obliqua 133°. 42′. cui per Probl. V respondens 7°. 18′ ♋ (ad Elevationem poli supra Horizontem promissoris computatus) est ipse locus, ad quem ♂ hoc arcu Directionis graduum 58°. 13′. perveniet, nimirum ad corpus ♄ni.

PARALIPOMENA.

Conversio Graduum in horas, & vicissim horarum in gradus.



Quando gradus & minuta convertenda sunt in horas, divide ipsos gradus per quindecim, quotus exhibet horas; quod à divisione reliquum, multiplica per 4, productum dat minuta horaria: Similiter divide minuta per quindecim, quotus exhibet etiamnum minuta horaria; quod à divisione reliquum, multiplica per 4, productum dat secunda horaria.

Horas multiplica per 15, productum dat gradus; minuta verò divide per 4, quotus exhibet etiamnum gradus: quod à divisione reliquum, multiplica similiter per 15, productum dat minuta; secunda verò divide per 4, quotus exhibet etiamnum minuta: quod à divisione reliquum, multiplica per 15, productum dat secunda.

D. Crügerus Astronom. Sphær. pag. 21.

Observatio lineæ meridianæ Astronomica sic instituitur.

In plano lævigato & ad Horizontem æquilibrato firmiterq; fixo ducantur ex eodem centro quamplures circu-

circuli, & in centro figatur perpendiculariter lignum altitudine trium circiter digitorum, sustinēs in apice laminam orichalcicam, per cujus minutulum foramen Radius Solis transeat. Ac tum antemeridiano tempore observetur accuratè, punctoq; notetur, incidentia radii Solaris in ductos circulos, quotquot asequi radius potest: itemq; tempore pomeridiano observetur radiorum solarium reditus ad eosdem ordinè circulos. Quo facto si singuli arcus respondentibus binis punctis intercepti Geometricè bisecentur, linea bisectrix est meridiana.

Idem pag. 36. *de Elevatione poli explorandâ.*

Priori modo, Si Quadrante (satis capaci & affabrè elaborato) super linea meridiana præcisè fixo observetur stellæ alicujus polo elevato vicinæ Altitudo tam maxima quàm minima; differentia altitudinum dimidiata Minori addita vel Majori subtracta (vel summa altitudinum dimidiata) ostendit Elevationem poli quæsitam.

Posteriori modo, Si Quadrante super linea meridiana fixo observetur in Solstitio æstivo (vel etiam pridie aut postridie) Altitudo Solis meridiana, eaq; per parallaxin limitetur, & à limitata subtrahatur vera obliquitas Ecliptica; restat elevatio Æquatoris, cujus Complementum est Elevatio poli.

Sequentia Problemate VIImo tradita commodiùs inferentur Problemate IIdo ante Exemplum: Sol meridie culminat. Hujus Ascensionem rectam aufer ab Ascensione rectâ stellæ. Residuum conversum in horas ostendit, quot horis post meridiem stella culminet.

Problemate IIItio post inventam dimidiatam sideris moram supra & infra Horizontem: Momento culmi-

natio-

nationis dimidiatam sideris moram supra Horizontem { detrahe, ut Ortûs / adde, ut Occasûs } sideris hora emergat.

Problemate IV & V o; 3tium datum, nimirum Ang. Or. (Oc.) est Æquatoris & Horizontis, Dantisci 35°. 37'. supple: vel ejus complementum ad 180.

Iam verò cum Tabulis redeamus in gratiam, quarum Universales, (quoniam sæpius & ubiq; sunt commodæ) solas damus: Nam particulares, nisi ad Minuta quoq; Graduum supputatæ, ne Regiomontani quidem aut Leovitii quamvis amplissimæ id præstant, quod calculus noster Trigonometricus.

	Declinationes.						Ang. Eclipt. & Merid.						
	♈	♎	♉	♏	♊	♐	♈	♎	♉	♏	♊	♐	
0	0° 0′		11° 30′		20° 12′		66° 30′		69° 22′		77° 44′		30
1	0. 24		11. 51		20. 25		66. 30		69. 34		78. 6		29
2	0. 48		12. 11		20. 37		66. 31		69. 46		78. 28		28
3	1. 12		12. 33		20. 49		66. 32		69. 58		78. 50		27
4	1. 36		12. 53		21. 0		66. 33		70. 11		79. 12		26
5	2. 0		13. 13		21. 11		66. 35		70. 24		79. 35		25
6	2. 23		13. 33		21. 22		66. 37		70. 37		79. 58		24
7	2. 47		13. 53		21. 32		66. 39		70. 51		80. 21		23
8	3. 11		14. 13		21. 42		66. 42		71. 5		80. 45		22
9	3. 35		14. 32		21. 51		66. 46		71. 20		81. 9		21
10	3. 58		14. 51		22. 0		66. 49		71. 35		81. 33		20
11	4. 22		15. 10		22. 9		66. 53		71. 50		81. 57		19
12	4. 45		15. 28		22. 17		66. 58		72. 6		82. 21		18
13	5. 9		15. 47		22. 25		67. 2		72. 22		82. 45		17
14	5. 32		16. 5		22. 32		67. 7		72. 38		83. 10		16
15	5. 55		16. 23		22. 39		67. 13		72. 55		83. 35		15
16	6. 19		16. 40		22. 46		67. 19		73. 12		84. 0		14
17	6. 42		16. 57		22. 52		67. 25		73. 29		84. 25		13
18	7. 5		17. 14		22. 57		67. 32		73. 47		84. 50		12
19	7. 28		17. 31		23. 3		67. 39		74. 5		85. 15		11
20	7. 50		17. 47		23. 7		67. 47		74. 23		85. 41		10
21	8. 13		18. 3		23. 12		67. 54		74. 42		86. 7		9
22	8. 35		18. 19		23. 15		68. 3		75. 1		86. 32		8
23	8. 58		18. 34		23. 19		68. 11		75. 20		86. 58		7
24	9. 20		18. 49		23. 22		68. 20		75. 40		87. 24		6
25	9. 42		19. 4		23. 24		68. 30		76. 0		87. 50		5
26	10. 4		19. 18		23. 26		68. 39		76. 20		88. 16		4
27	10. 26		19. 32		23. 28		68. 49		76. 41		88. 42		3
28	10. 47		19. 46		23. 29		69. 0		77. 1		89. 8		2
29	11. 9		19. 59		23. 30		69. 11		77. 23		89. 34		1
30	11. 30		20. 12		23. 30		69. 22		77. 44		90. 0		0
	♓	♍	♒	♌	♑	♋	♓	♍	♒	♌	♑	♋	

Ad Obliquitatem

Ascensiones

	♈	♉	♊	♋	♌	♍
0	0°. 0′	27°. 54′	57°. 48′	90°. 0′	122°. 12′	152°. 6′
1	0. 55	28. 51	58. 51	91. 5	123. 14	153. 3
2	1. 50	29. 49	59. 54	92. 11	124. 16	154. 0
3	2. 45	30. 47	60. 57	93. 16	125. 18	154. 57
4	3. 40	31. 44	62. 0	94. 22	126. 20	155. 54
5	4. 35	32. 42	63. 3	95. 27	127. 22	156. 51
6	5. 30	33. 40	64. 6	96. 32	128. 23	157. 47
7	6. 25	34. 39	65. 10	97. 38	129. 25	158. 44
8	7. 21	35. 37	66. 13	98. 43	130. 26	159. 40
9	8. 16	36. 36	67. 17	99. 48	131. 27	160. 36
10	9. 11	37. 35	68. 21	100. 53	132. 27	161. 33
11	10. 6	38. 35	69. 25	101. 58	133. 28	162. 29
12	11. 2	39. 33	70. 29	103. 3	134. 29	163. 24
13	11. 57	40. 32	71. 34	104. 8	135. 29	164. 20
14	12. 53	41. 32	72. 38	105. 13	136. 29	165. 16
15	13. 48	42. 31	73. 43	106. 17	137. 29	166. 13
16	14. 44	43. 31	74. 47	107. 22	138. 28	167. 7
17	15. 40	44. 31	75. 52	108. 26	139. 28	168. 3
18	16. 36	45. 31	76. 57	109. 31	140. 27	168. 58
19	17. 31	46. 32	78. 1	110. 35	141. 26	169. 54
20	18. 27	47. 33	79. 7	111. 39	142. 25	170. 49
21	19. 24	48. 33	80. 12	112. 43	143. 24	171. 44
22	20. 20	49. 34	81. 17	113. 47	144. 23	172. 39
23	21. 16	50. 35	82. 22	114. 50	145. 21	173. 35
24	22. 13	51. 37	83. 28	115. 54	146. 20	174. 30
25	23. 9	52. 38	84. 33	116. 57	147. 18	175. 25
26	24. 6	53. 40	85. 38	118. 0	148. 16	176. 20
27	25. 3	54. 42	86. 44	119. 3	149. 13	177. 15
28	26. 0	55. 44	87. 49	120. 6	150. 11	178. 10
29	26. 57	56. 46	88. 55	121. 9	151. 9	179. 5
30	27. 54	57. 48	90. 0	122. 12	152. 6	180. 0

Eclipticæ 23. 30

Rectæ.

	♎	♏	♐	♑	♒	♓
	° ′	° ′	° ′	° ′	° ′	° ′
0	180. 0	207. 54	237. 48	270 0	302. 12	332. 6
1	180. 55	208. 51	238. 51	271. 5	303. 14	333. 3
2	181. 50	209. 49	239. 54	272. 11	304. 16	334. 0
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